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Description of Heating and Ventilating for the Municipal Building in New York City

By Harold L. Alt

In the city of New York and rapidly nearing completion stands the new Municipal Building which is being built by the city at a cost of about ten million dollars under the supervision of its engineers in the bridge department from plans prepared by the well known firm of New York architects, McKim, Meade & White. While the upper floors will be utilized simply as offices by the various city departments now scattered promiscuously about in sundry locations, the building presents several novel features; the two principal ones consist of the handing over of the entire basement for rapid transit subway uses (thus forcing much of the machinery and other apparatus outside of the actual building line) and the cutting of Chambers Street directly through the heart of the structure by means of an arched arcade at the street level which extends up as high as the fourth floor. This makes it impossible to place all of the mechanical apparatus usually installed in basements in such a location in this building, and to overcome this, the fourth floor has been appropriated as a horizontal distributing place and a great deal of apparatus located at that level.

The heating of this building (which was designed by Nygren, Tenney & Ohmes of New York) is principally two-pipe, direct steam heat, supplemented by ventilating systems, both of which are briefly described in this article. Of course on a structure of this kind it is impossible to present to our readers full and complete plans, but a typical lay-out together with some of the more interesting details are shown in order to give as near as possible in so brief a space a general idea of the scheme used and piping installed.

Direct Steam Heating.

The entire steam heating supply is furnished by the high pressure boilers through an 8 inch h. p. reducing valve (which brings the pressure down to an intermediate point) and then through two 6-inch x 12-inch reducing valves which bring the steam down to a pressure low enough to be suitable for heating purposes. These valves and their by-passes are connected into a distributing header from which all the steam heating supply lines are taken. The returns are gathered together and connected up into a corresponding return header in a manner similar to the supplies.

At the foot of each steam supply riser is provided a relief pipe of 1 inch in size or larger and also from each expansion loop, each horizontal transier of the risers and at points where required on the horizontal mains. All these individual relief pipes are connected into separate mains which are run to the vacuum pumps and receiving tank. Suitable seals are provided on the tank connections so arranged that they will discharge into the receiving tank by gravity, and on each pump connection is provided a thermostatic trap and valve. All horizontal return mains are carefully run above the vacuum pumps so that the returns will flow into the pumps by gravity.

In connection with the vacuum return system are installed four vacuum pumps. Two of these are connected direct to the heating and ventilating systems and are 12 inch x 18 inch x 24 inch. The other two are used on the hot water heaters and refrigerating machines and are 6 inch x 8 inch x 12 inch. These pumps are all brass fitted and brass lined, and have installed nearby two polished marble gauge boards attached to each of which are two compound gauges which are connected to the steam and return lines in such a position as to show the average pressure or vacuum. Each return before entering the pump is provided with a valve and passes through a combination dirt catcher and jet condenser.

The steam piping of 6 inch in diameter or over is made up of standard, guaranteed, full weight, steel pipe with "Van Stone" flanged ends and rolled, weldless, steel flanges, the ends of the pipe being upset to a thickness 50 per cent greater before flanging. Fig. 2 shows a detail of this "Van Stone" joint both between pipes and also between pipes and fittings. The fittings used with this pipe are heavy, flanged fittings of the best grade of cast iron with raised faces to meet the "Van Stone" ends of the pipes. The pipe on the smaller supply, return, and relief risers (except the return and relief through the first story) is of extra-strong wrought iron pipe with heavy cast iron fittings. The return and relief risers through the first story are run in standard iron-pipe-size brass pipe with standard iron-size brass fittings.

The "Van Stone" joints together with all other flanged joints are packed with corrugated copper or other approved gaskets while all screw joints are made tight without calking.

Each set of risers is provided with valves on the steam, return and relief connections close to their respective mains.

On all valves of the distributing, relief and return head-

ers are attached indicative plates of brass, polished and lacquered, with the lettering filled in with black paint.

Valves for risers located in walls are taken care of by suitable wall pockets, in which are set 18 oz. copper boxes enclosing the valves, and making tight joints around the pipes, where they pass into and out of the boxes. These boxes have tight closing steel doors with cast iron frames.

Expansion on the risers is taken care of by the expansion loops before mentioned which are run in the floor construction below the finished floors and are encased in galvanized iron boxes of No. 22 gauge galvanized iron, which completely enclose the loop and are made water tight. These boxes are filled with mineral wool after the installation of the pipe.

The radiator connections to and from all risers are run below the finished floor lines with sufficient clearance above to allow the covering to be applied without interfering with the finished floor material.

Radiator connections as installed are based on the following sizes:

Radiators up to 40 square feet of surface, ¾ inch and ½ inch.

Radiators up to 90 square feet of surface 1 inch and ½ inch.

Radiators up to 160 square feet of surface, 1¼ inch and ¾ inch.

On the supply end of each radiator is placed a thermostatic diaphragm valve, while a vacuum return valve is attached to the return end.

The radiators installed are of the cast iron sectional type with threaded cast iron nipples and are single, double or three column as determined by the space allowable and the surface required. Where set along curved walls, special curved radiators are used. The heating coils used are made up of standard, guaranteed, full weight, wrought iron pipe with heavy cast iron headers or return bends.

All pipes below the first floor are covered with a single standard 1 inch thickness of magnesia sectional covering, canvas jacketed with bands. Pipes rising through the first story are covered 2 inch thick in a similar manner. From the first floor up the risers are in general covered the same as below the first floor.

The fittings and valves on all covered pipes are covered with moulded, canvas jacketed, magnesia, sectional covering of the same thickness as the pipe.

The New Municipal Building in New York City.

Indirect Steam Heating and Ventilating Systems for Lower Floors.

Fresh air supply is provided for the machinery department, and tempered fresh air for the spaces in the basement mezzanine as well as exhaust systems for both. The indirect heating is applied to the main entrances by means of circulating air through heating coils located in the basement mezzanine.

All indirect heating and ventilating apparatus is erected on foundations of well burned brick laid up in cement mortar and capped (for the blowers and exhausters) with 6 inch of fine axed blue stone 12 inch wide, with beveled edges. The entire tops of all other foundations are capped in a similar manner. All exposed brickwork is faced with the best American enameled brick, with bull-nozed corners.

The apparatus installed may be outlined as follows:

Four steel plate centrifugal multivane fans; two for the fresh air supply to the mezzanine spaces and machinery rooms having blast wheels 52½ inch in diameter and casings 36¼ inch wide; and two for the exhaust of the same rooms with 58¼ inch blast wheels and casings 40¼ inch wide. The exhaust fans are coupled together on one shaft and all fans have self-oiling devices. Motive power is furnished by driving motors through flexible flange couplings.

Two sets of heating coils and one set of tempering coils, of which the heating coils are used in connection with the 42 inch disc fans for heating the entrances and the tempering coil in connection with the blower for the basement mezzanine spaces.

The heating coils contain each 660 square feet of heating surface and are made up of four 4 row sections, 4 feet wide x 5 feet high, making each coil 16 rows deep. The tempering coil has 1,162 square feet of surface, and is made up of six 2 row sections 8 feet wide x 6 feet high, making this coil 12 rows deep. All sections are of mitre pattern and are made up of 1 inch pipe spaced 2⅛ inch on centers screwed into separate cast iron headers.

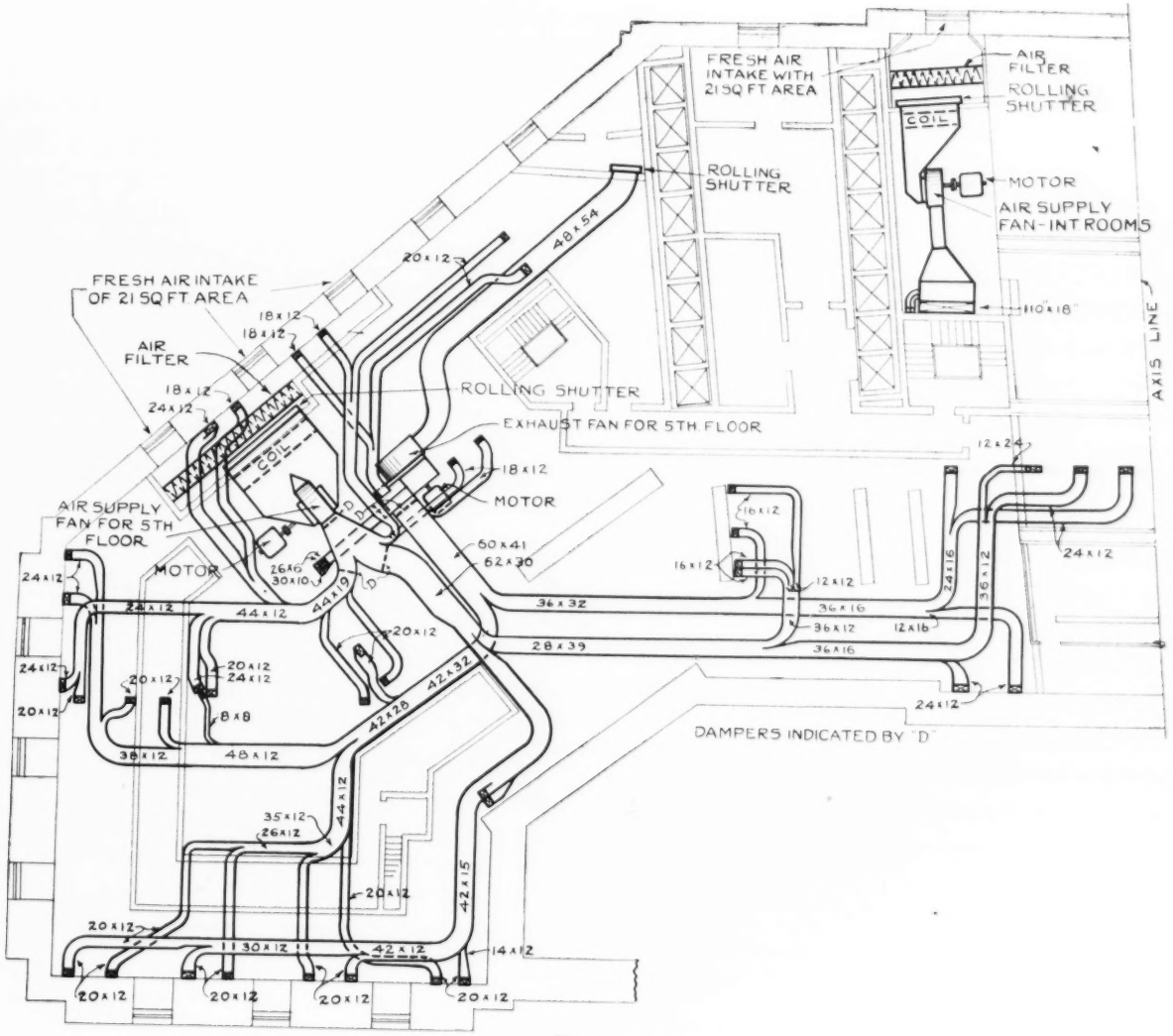


Fig. 1.

The coils are encased in jackets of No. 10 gauge steel plate, the casing on the tempering coil extending from the fresh air chamber to the blower inlet and that on the heating coils from the air duct on one end to and enclosing the disc fan on the other.

On the air inlet to the tempering coil are installed three rolling shutters covering the entire opening, balanced by springs, and operated by hoist and hand chains. The shutters are enclosed in copper hoods and have their ends run in slots made with angle irons.

In the fresh air chambers are built the air filters which

consist of substantial wooden frames with copper wire netting covered with cheese cloth. Each set has a filter area of about 900 square feet. These filters have two cleaning hoppers made of No. 20 gauge galvanized iron braced with angle iron and supported on a wrought iron stand at convenient height.

The outside sections of the tempering coils are con-

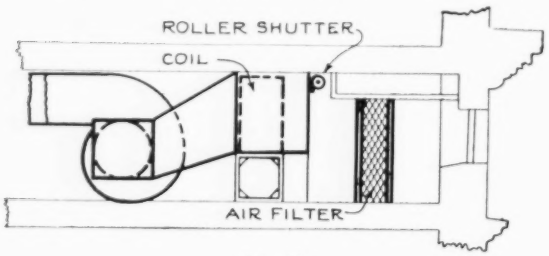


Fig. 1A.

trolled by a cold air thermostat located in the fresh air chamber, automatically shutting off the diaphragm valves on the steam and return pipes when the air rises to a certain degree and re-opening these valves when the air drops below this degree, thus securing a continuous heating effect from these sections when desired.

The inside sections of the tempering coils are controlled by a hot air thermostat located in the main tempered air duct which automatically moves the diaphragm valves on the supply and return pipes so as to give an even temperature of air in the ducts.

The disc fans spoken of are two "Blackman" type disc fans of 42 inch diameter with circular frames and arranged for direct connected motors. The wheels of each exhaust fan are built upon two hubs from one of which spokes radiate and connect with a tire and from the other of which the spokes radiate so as to reinforce and carry the curved edges of the blades.

To drive the fans there are installed five slow speed motors; two (for the air supply blowers) of 12 horsepower and a maximum speed of 220 revolutions per minute; two (for the 42 inch disc fans) of 4 horsepower and a maximum speed of 400 revolutions per minute; and one (for the two exhausters on a single shaft) of 30 horsepower and a maximum speed of 200 revolutions per minute. These motors are of the multi-polar type, with field control and have flange couplings for connection to fan shafts. Their operation is governed by speed-control regulating devices which allow six or more variations in speed ranging from ½ to full speed.

The duct systems consist of a connection between one

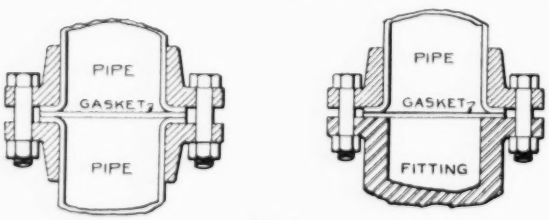


Fig. 2.

of the air supply fans and all the air supply outlets in the machinery rooms, a connection between the other air supply fan and all the outlets in the basement mezzanine spaces, a system of warm air ducts and flues beginning at the heating coils and terminating in the main entrances, a system of circulating ducts from the main entrances to the disc fans, a system of exhaust ducts between the machinery rooms and basement mezzanine spaces and the exhausters, and the discharge ducts from the exhausters which are run to the outlet windows on Chambers Street.

These ducts are all constructed of the best bloom galvanized iron and the gauges used are as follows:

No. 20 braced with angle iron for all having one dimension of 48 inch or over.

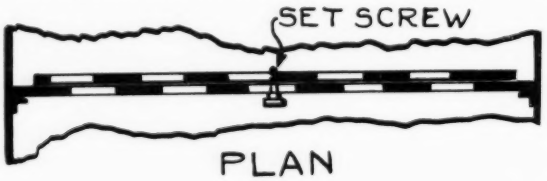
No. 20 plain for all having one dimension of 30 inch to 48 inch.

No. 22 plain for all having one dimension of 12 inch to 30 inch.

No. 24 plain for all smaller size.

They are all built tight with slip joints of smooth inside surface and neat outside finish. Ducts are constructed in all cases where possible with the inside radius of the bends not less than the width of the duct and are supported by galvanized iron hangers. Steam pipes or other obstructions were not permitted to be run through the ducts in any case.

The registers used are of plain lattice design with white



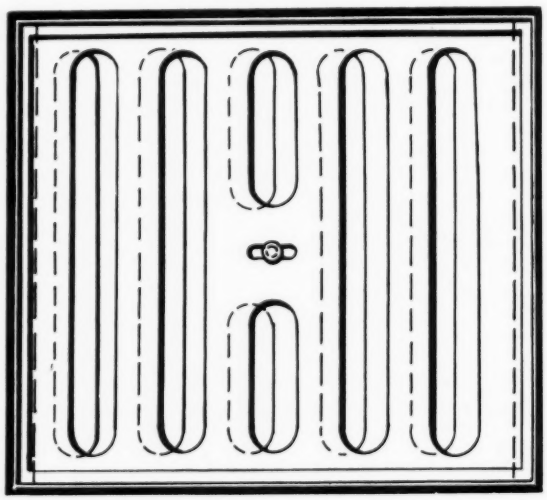


Fig. 3.

porcelain finish, with valves set in horizontal or vertical position as required and with screens of No. 10 gauge copper or brass wire of ¾ inch mesh held in substantial brass frames.

The twelve radiators and eight individual sections of the two heating coils for the entrances are each separately controlled by a pneumatic switch enclosed in a cabinet and set in a recess in the entrance furring.

The housings of the fresh air supply blowers, the exhausters, the casings of the disc fans, and the casings over the tempering and heating coils are all covered with magnesia blocks 1 inch thick, wired on, cemented and encased with a jacket of 10 oz. canvas drawn tight and sewed on. Similar covering is applied to the tempered, and cold air ducts, discharge ducts from exhaust fans, all

ducts for warm or re-circulated air and all exhaust flues and ducts in the basement and basement mezzanine.

Indirect Steam Heating and Ventilating Systems for Upper Floors.

The indirect heating and exhaust systems for the offices and other sections of the building above the fourth floor are practically separate and independent of those below this level (which have just been described) and are extended in the following manner:

The tempered fresh air supply for all floors above the fourth is run to the principal rooms of the fifth story from two centrifugal fans, and to the various interior rooms adjacent to the central staircase from two other centrifugal fans. All four fans are located in the fourth story, a plan of the main duct runs in the north half (which is also fairly typical of the southern portion) being shown in Fig. 1. Exhaust ventilation for the principal rooms of the fifth story is provided by two centrifugal exhaust fans set in the fourth story and for the various other rooms, corridors and toilets by six disc fans located at various points on the upper floors.

The apparatus as hereafter enumerated is all mounted on foundations of brick laid in cement mortar being capped with hard pine fire-proofed timber and a 2 inch thickness of compressed cork insulation in the cases of blowers, centrifugal exhausters, and their motors, and with 6 inches thick blue stone under the tempering coils and motors. The exposed brick facings are laid up with white enamel brick similar to those in the basement.

The fans are all steel plate multivane fans, the two for the fifth story air supply being 36¼ inch wide with a 52½ inch wheel, the other two fresh air fans being 32¼ inch wide with a 46½ inch wheel while the exhausters for the fifth story are the same size as the fresh air fans. All the fans are provided with self-oiling devices and are direct connected to the motors through flexible flange couplings. The motors for the 52½ inch air supply fans are of 24 horsepower and run at 265 revolutions per minute, those for the 46½ inch air supply fans are of 16 horsepower and run at 280 revolutions per minute, while the ones operating the 52½ inch exhaust fans are of 20 horsepower at 250 revolutions per minute. These motors are of the multi-polar direct-current 240-volt type, built for field control with speed regulating devices allowing six variations between one-half and full speed.

The six disc fans installed are of the "Blackman" type with circular frames and direct connected motors, and are similar to those previously described for the lower floors. Two of these fans are used for exhausting air from various interior rooms and are 4 feet 6 inch in diameter. One is used for exhausting air from the toilets adjoining the northerly elevators and two for exhausting air from the various corridors, all three being 6 feet in diameter. The sixth is used for exhausting the air from the toilet rooms adjoining the southerly elevators and is 6 feet 6 inch in diameter. These fans are driven by motors of a type similar to those on the multivane fans with like control. The motors for the 4 feet 6 inch fans are of 6 horsepower at 325 revolutions per minute, those for the 6 feet fans are of 10 horsepower at 250 and 275 revolutions per minute, and the one for the 6 feet 6 inch fan is of 12 horsepower at 225 revolutions per minute.

The tempering coils installed are erected in four sets, two of which are used in connection with the fifth story blowers, each having 1,460 square feet of heating surface composed of 1¼ inch pipe in six 2 row sections 14 feet 6 inch wide by 4 feet high (making a 12 row coil.) The other two coils are operated with the blowers for the various interior rooms, each having 980 square feet of heating surface composed of 1 inch pipe set in six 2 row sections making this coil also a 12 row coil; all coils are of miter pattern and of wrought iron pipe screwed into separate cast iron headers on both the steam and the return ends.

The inside sections of these tempering coils are controlled by hot air thermostats connected through diaphragm valves to the steam supply and return lines similar to those described on the lower floors. These thermostats are placed in the main tempered air ducts, while other thermostats are placed in the fresh air chambers to control the outside sections of these coils and maintain a continuous heating effect, also similar to those used on the lower floors previously described.

The casings for the coils are removable and extend from the fresh air chamber to the blower inlet-being constructed of No. 10 gauge steel plate, securely braced to prevent vibration, and having rolling shutters of No. 18 galvanized iron located as shown in Fig. 1.

The duct and flue systems for the upper floors constitute the following:

Two systems connecting the fifth story blowers with the outlets in the fifth story, the north system of which

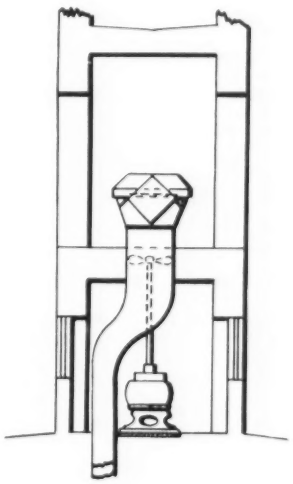


Fig. 4.

is shown in Fig. 1, and a cross section of the intake, filter, coils and fan in Fig. 1A.

Two systems connecting the other two blowers with the various interior rooms above the fifth story, the north system of which is also shown in Fig. 1.

The exhaust system between the fifth story inlets and the two fifth story exhaust fans, also shown on Fig. 1.

Two exhaust systems between the various interior rooms and the remaining two multivane exhausters.

Two exhaust systems connecting all exhaust registers in the toilets and two connecting all exhaust registers in the interior rooms with four disc fans in the upper part of the building.

Two exhaust systems between the registers in the corridors and two disc fans in the upper portion of the building.

Also air discharge ducts with rolling shutters of No. 18 galvanized iron connecting the outlets of the fifth floor exhaust fans with the air shafts, as shown in Fig. 1.

The ducts and flues are similar to those in the lower floors already described and are provided with proper

dampers and deflectors. A detail of one of the dampers is shown in Fig. 3.

The fresh air inlet openings are protected by a No. 10 gauge copper wire screen of 1 inch mesh supported on channel frames of solid bronze.

The air discharges for the six disc exhaust fans are of 30 oz. copper, connected to the fan frame, extended the desired height and capped with a protecting hood of equal weight copper. A typical detail of one of these discharges is shown in Fig. 4.

In the fresh air chambers are located four sets of fresh air filters similar to those described for the lower floors, the location of which can be seen by referring to Fig. 1, and an elevation in detail is shown in Fig. 5.

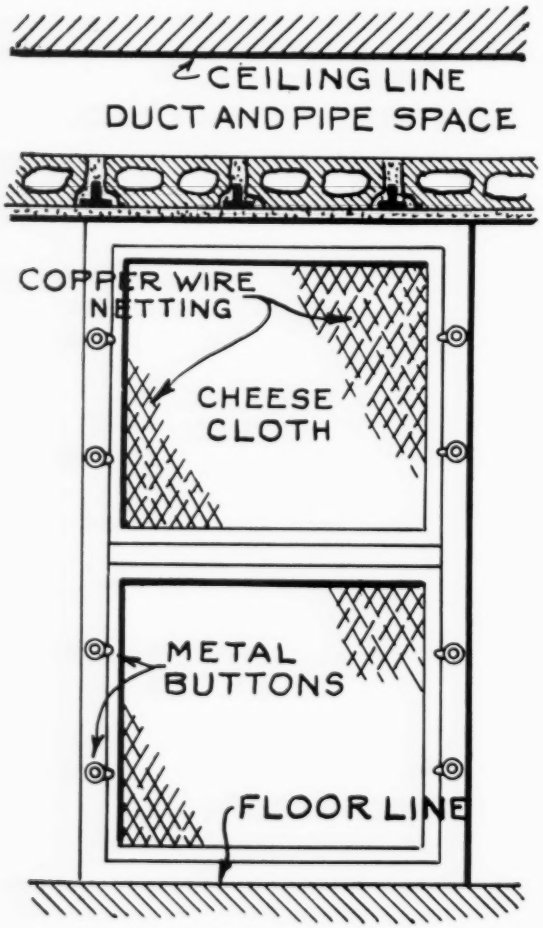


Fig. 5.

The housings of the fresh air blowers, the casings of the tempering coils and the connections between the filter chambers and coils as well as between the coils and the blowers, together with all the air supply ducts and flues in the fourth story are covered with 1 inch thick magnesia blocks wired on, cemented and encased with a 10 oz. canvas jacket, sewed on. The housings and inlet boxes on the two multivane exhausters, and all exhaust ducts and flues in the fourth story are covered with 1 inch asbestos air-cell covering wired, cemented and canvas covered, same as the air supply systems.

The air supply flues in the outer walls through the fifth story are covered with 1 inch magnesia blocks, cemeted and wired in place to angle irons formed of No. 20 gauge galvanized iron applied on all four corners to the entire height of the flues.

On completion of the work, all portions of the tempering coils, casings, insides of all blower fan housings, and the paddle wheels, including all surfaces brought into contact with the air supply were painted with odorless, non-scaling paint. All the exposed radiators, coils, and heating pipes above the basement were painted one coat of paint and one coat of bronze. All motors, bearings, and other machinery were primed and filled, and painted with three coats of pure linseed oil and best white lead after which they were tinted, striped and varnished.

All apparatus to which insulating covering was applied received a single coat of paint before the covering was put on, and all canvas jacket over the various coverings is painted with two coats of cold water paint. The galvanized iron work which is exposed, including the inside of the flues back of the registers was given two coats of paint, and all uncovered galvanized iron work set in brickwork, furring, etc., was given two coats of metallic paint before setting. On the outside of all coils, fans, main ducts, and every branch duct is painted in a conspicuous place the name and destination in distinct block lettering.

NEW BUSINESS VENTURES.

Dover, Del.—The Keystone Plumbing Co. of this city has been incorporated with a capital of $10,000, to engage in a general plumbing and gas fitting business.

Portage, Wis.—The plumbing firm of Shackell & Collins has rented the Miller building on East Cook Street, and will open for business soon. The firm is composed of Richard Shackell and W. H. Collins, both experienced men in the plumbing line.

Brooklyn, N. Y.—Dayton & Montgomery Inc. is the firm name of a corporation recently organized to engage in a general plumbing business, with a capital of $10,000. The directors are: Ralph E. Dayton, Mabel B. Dayton and Harry M. Clark, all of Brooklyn.

Stevens Point, Wis.—The new plumbing firm of C. E. Knapp & Co. is now ready for business. Most of their stock and fixtures have arrived and have been placed in their office and shop in the Adams building on Division Street back of the Majestic hotel.

Spartanburg, S. C.—The E. L. Stallings Co., of this city, has been incorporated with a capital of $10,000 to conduct a plumbing, heating and lighting business. The incorporators are: E. L. Stallings and Otto Zabel.

Pittsburgh, Pa.—The Kohne Bros. Co. has been incorporated with a capital of $10,000, to conduct a plumbing business. The incorporators are: C. C. Kohne, H. F. Kohne and A. R. Moody.
of this city.

Spokane, Wash.—The Selb-Hutton Plumbing Co., which has just been organized and is now fitting up a large shop, show rooms and stock rooms at 29 Main Avenue, has secured the contract for plumbing in the new city hall and for the new Hay's Park school building. It is expected that a large crew of men will be kept busy on this work the greater part of the summer and coming fall.

Crawfordsville, Ind.—The Crawfordsville Plumbing Co. has been incorporated with a capital of $10,000 to conduct a general plumbing business. The directors are: J. N. Dickerson, Lew Wade and Walter Kelly.

New York City.—Philip Leavitt, Inc., is the style of a corporation recently organized to conduct a plumbing and contracting business. The capital is $10,000. The incorporators are: P. Leavitt and H. S. Leavitt.

San Jose, Ill.—John D. Smith has rented from the San Jose State bank a strip of ground and will soon erect a new building upon it, in which he intends to conduct a plumbing establishment.

Analysis of the Principal Provisions of the Plumbing Codes of Thirty-seven of the Principal Cities in the United States

By Thomas S. Ainge, Sanitary Engineer, Lansing, Michigan

(*Continued from July 20th Issue*)

TOILET ROOMS.

The specifications of the codes relative to toilet rooms are shown in Exhibit XI.

In six of the codes, no specifications are found relative to this subject; in seven other codes, the specifications are very meager and indefinite; and in nearly all of the remaining codes, the specifications are lacking in some one or more particular. In this connection, it may be stated that no specification should be included in a plumbing code covering work which a plumber will not perform, or for which he will not be directly responsible; and the specifications governing the general construction of toilet rooms should, very properly, be included in the general code governing the construction of buildings, which should be in force in every well governed city.

Prohibited Locations.

As stated in the accompanying exhibit, the specifications relative to the prohibited locations for toilet rooms are practically the same as in the case of water closets, which were considered in Exhibit X, and accompanying text, in the preceding article.

Location with Respect to Other Rooms.

The specifications relative to the location of toilet rooms with respect to other rooms in the same building have reference, principally, to the securing of privacy and to the prevention of the escape from the toilet rooms to other rooms in their vicinity of foul air; and, for this reason, this phase of the subject should be studied in connection with the section which follows, entitled, "Walls and Partitions."

In one code, the specifications require the location of the toilet rooms of places where liquor is sold to be such that they may be accessible to persons living in the same building without passing through that portion of the building where the liquor is sold. This specification might, very properly, be changed to require separate toilet accommodation for those portions of the building not used for the sale of liquor.

In another code, the specifications require that the traveling distance between toilet rooms for the separate sexes in the same building be not less than twenty feet. While the greatest possible distance between such rooms may be desirable, in the interests of privacy, even the distance above given may not always be obtainable and, in such cases, a sound proof partition between the rooms and proper screening of the entrances as specified in the Ohio State Building Code, should be considered sufficient.

Dimensions.

Specifications relative to the dimensions of toilet rooms are found in but six of the codes, and these have reference, principally, to the dimensions of single water closet compartments only, and display the usual lack of uniformity and incompleteness, as may be seen by reference to the accompanying exhibit.

Walls and Partitions.

Specifications relative to the construction of the walls and partitions of toilet rooms are contained in but thirteen of the codes, and these have reference, principally, to the enclosures of water closets only and are more nearly uniform in their character than very many of the specifications of the codes relative to other details of plumbing work. With but one exception, however, there is no specification relative to the provision of a space between the floor of the toilet rooms and the under side of the inside partitions which constitute the enclosures of water closets and urinals in buildings of a public or semi-public character—a provision which is essential to the proper lighting, ventilating and cleansing of the toilet rooms of such buildings and which should be made a requirement in every code governing the construction of toilet rooms of this character.

Construction of Floors and Base.

Specifications relative to the construction of the floors and base of toilet rooms, with the view of facilitating the cleansing of such rooms, are found in but twelve of the codes, and in ten of these, the specifications do not differ materially save in respect to the nature of the waterproofing material and in the height to which the same shall extend above the floor line.

In eight of the codes, the requirement of a waterproof floor and base has reference to buildings in which the toilet rooms are made use of by the public or by the members of more than one family, and in one, the requirement seems to cover the toilet rooms of both public and private buildings. The desirability of a waterproof floor and base in the toilet rooms of buildings of every description will not be questioned, but it is a question whether in a code governing such work, such a requirement should be made to include the toilet rooms of ordinary dwellings.

In the New York code, it is provided that, in all new work and in all alterations where it is not impossible to use it because of pipes or other obstructions, every earthenware closet must set on a natural stone slab; and while such an arrangement may be considered desirable in the case of toilet rooms having wooden floors, and this view is shared by the Ohio State Department of Buildings, it would not seem to be necessary in the case of toilet rooms of public buildings, the floors of which, according to the code, must be made of asphalt, tile, metal, or other non-absorbent material. The Jersey City code requires the setting of closets in public buildings and factories on a natural stone slab wherever possible. A level and substantial floor of hardwood, as in the toilet rooms of dwelling houses, or of any of the usual waterproof materials used in the construction of the floors of toilet rooms in public buildings, would seem to be a proper base for a water closet without the additional expense of a natural stone slab and its setting.

EXHIBIT XI.—TOILET ROOMS

LIST OF THE CITIES AND THEIR INDEX NUMBERS.

Every number in this exhibit in bold-faced type stands for a city and shows that the specification after which it appears applies in that city. Thus, 4 stands for Chicago; 31 for Syracuse; and so on.

1. Baltimore, Md.
2. Boston, Mass.
3. Buffalo, N. Y.
4. Chicago, Ill.
5. **Denver, Col.**
6. Detroit, Mich.
7. Fall River, Mass.
8. Indianapolis, Ind.
9. Jersey City, N. J.
10. Kansas City, Mo.
11. Los Angeles, Cal.
12. Louisville, Ky.
13. Memphis, Tenn.
14. Milwaukee, Wis.
15. Minneapolis, Minn.
16. Newark, N. J.
17. New Haven, Conn.
18. New Orleans, La.
19. New York, N. Y.
20. Ohio State Building Code, governing the cities of Cincinnati, Cleveland, Columbus and Toledo, O.
21. Omaha, Neb.
22. Paterson, N. J.
23. Pennsylvania State Plumbing Code, governing the cities of Pittsburgh and Scranton, Pa.
24. Philadelphia, Pa.
25. Providence, R. I.
26. Rochester, N. Y.
27. St. Joseph, Mo.
28. St. Louis, Mo.
29. St. Paul, Minn.
30. San Francisco, Cal.
31. Syracuse, N. Y.
32. Washington, D. C.
33. Worcester, Mass.

Prohibited Locations.

Practically the same as those specified for water closets, which were considered in Exhibit X.

Location with Respect to Other Rooms.

Door of water closet apartment in a dwelling house must not open other than into a hall.—**13.**

In places where liquor is sold, water closet and urinal apartments must be so located as to render them accessible to persons occupying the same building without passing through the place where liquor is sold.—**16.**

The traveling distance between the toilet rooms for the separate sexes in the same building to be not less than twenty feet.—**20.**

Water closet apartments in tenements not to open or connect with any other room; toilet rooms for the separate sexes in factories and department stores to be entirely separated from each other; yard closets not to have direct communication with any part of the building proper; water closet rooms in bakeries to be separate from the bake room.—**24.**

The doorway of the toilet rooms of two contiguous private rooms not to open into any public space or hallway.—**32.**

Outside water closet apartments not to have direct communication with any other building used for dwelling or business purposes.—**27.**

Dimensions.

Water closet compartments in tenements to be not less than 2 feet 4 inches wide.—**2.**

Water closet compartment to be not less than 2 feet 4 inches wide, with a floor area of at least 7 sq. ft.—**9.**

Water closet compartments to have not less than 12 sq. ft. of floor space.—**13.**

To be not less than 7 feet in height.—**20.**

Yard closet structures to be not more than 10 feet in height and not to occupy more than fifty per centum of the open space or yard in which they are placed.—**3.**

Yard closet structure to be not less than 3-4x7 ft. high.—**13.**

Yard closets to be housed within an enclosure not less in inside horizontal dimensions than 2 feet 6 inches by 4 feet, and not less than 6 feet in height.—**32.**

Walls and Partitions.

Water closets in tenements to be in a compartment completely separated from every water closet by a partition of plaster, or other equally suitable material, extending to the ceiling.—**2-3.**

Water closet or urinal compartment or bath room to be separated from any other room, workshop, office, or hall, by a tight partition extending from floor to ceiling.—**4.**

Water closet compartments to be enclosed on all sides with air-tight partitions, extending from floor to ceiling.—**9.**

Water closet or urinal apartments, or both, to be separated from other rooms by air-tight partitions extending to the ceiling, or be independently ceiled over.—**15-16-19-22-23-24-29.**

Water closet and urinal apartments to be enclosed in a tight partition.—**32.**

Toilet rooms for both sexes, when adjacent to each other, shall be separated by sound proof partitions, extending to the ceiling, and the entrances shall be screened. Interior doors and partitions shall be raised at least 6 inches above the floor. Urinals and urinal troughs and gutters to be divided into stalls, not less than 18 inches wide, by partitions not less than 4 feet 6 inches high, measured from the floor line, and 9 inches wide, raised not less than 1 inch above the floor.—**20.**

Interior partitions of water closet compartments to be dwarf.—**15-19-23-24-29.**

Interior partitions of water closet compartments in public buildings may be dwarf, yard closet compartments to be substantially built, tightly enclosed and partitioned off.—**9.**

Construction of Floors and Base.

Water closet apartments in tenements to be made waterproof with asphalt, tile, stone or other waterproof material, extending to a height of at least 6 inches above the floor on all sides, except at the door.—**2-3.**

Water closet apartments in tenements, factories, lodging houses, workshops, and all public buildings to be made waterproof with asphalt, tile, metal or other non-absorbent material, to a height of 6 inches above the floor, except at the door.—**9-19.**

Water closet and urinal apartments in lodging houses, factories, workshops and all public buildings to be constructed of approved non-corrosive and non-absorbent materials, to a height of 3 feet above the floor, except at the door.—**15.**

Toilet rooms, lavatories, water closet apartments, or any other enclosure where plumbing fixtures are used within a building, to have waterproof floor and base, made of non-absorbent indestructible material, viz., asphalt, glass, marble, Portland cement, vitrified or glazed tile or terrazo, or monolithic composition. Base to be not less than 6 inches high and have a sanitary cove at the floor level. Provided, that in apartments, tenements and dwellings, the waterproof floor and base will not be required, but no water closet shall set directly on top of a wooden floor but on a marble slab, or tile or other non-absorbent, incombustible material, not less than ⅞ inch thick, extending at least 1 foot in front of the water closet, and not less than 30 inches in width.—**20.**

Water closet apartments in tenements, lodging houses, factories, workshops and all public buildings, to be made waterproof with asphalt, cement, tile or other approved material, to a height of not less than 16 inches from the floor, except at the door.—**23.**

Water closet apartments in tenements (where two or

more closets are in a group), lodging houses, factories, workshops, saloons, public buildings, and in all places where water closets or urinals are for public use, to be made waterproof with asphalt, cement, tile, slate, or other approved material, to a height of at least 16 inches from the floor, except at the door —**24.**

Water closet and urinal apartments in general to be constructed in such manner that there shall be no angles or corners; all joints between marble, tile, plaster, or trim to be flush; and all junctions between walls, ceilings and floors to have not less than 3 inch cove. Floor, and walls, to a height of 6 feet to be lined with slate, marble, vitrified tile, or other approved non-absorbent material. The walls above the waterproofing and the ceiling may be smooth metal or hard plaster, painted with a waterproof gloss finish. —**32.**

Urinal apartments in general to be lined with non-absorbent and non-corrosive material.—**16-19-23-24.**

Public urinals to have some kind of non-absorbent safe placed in the floor under same, except in cases where the floor is of non-absorbent material.—**21.**

Earthenware closets in general to be set on a natural stone slab. Sand or artificial stone will not be allowed.—**19.**

Where possible, water closets in public buildings and factories to set on a natural stone slab.—**9.**

Outside water closet apartments to have floor of concrete, or other waterproofing material—**32.**

Floor and foundation of outside water closet apartments to be of concrete, cemented, smooth finished. Above concrete, floor may be of wood, or other material, set 6 inches above the surface.—**13.**

Lighting and Ventilation.

Water closet apartment to have direct communication with the outer air by means of a window, or air shaft of at least 4 sq. ft. in area, for the admission of air and light.—**1.**

Every enclosure containing one or more water closets to be provided with adequate ventilation to the outer air by means of a window or suitable light shaft.—**2.**

In tenements, the water closet apartment to have a window, at least 1 ft. x 3 ft. between stop beads, made to open readily, and opening directly, or through a straight horizontal shaft of the same dimensions as the window and not more than 4 ft. long, upon a street, a railroad right of way, cemetery, or public park, or a yard or alley or open passageway not less than 4 ft. wide, or upon a court vent, or upon a covered passageway not more than 20 ft. long and at least 20 ft. wide and 20 ft. high. When the apartment is located on the top floor, and is lighted and ventilated by a skylight vent, no window will be necessary, provided, that the skylight contains at least 3 sq. ft. of glazed surface and is arranged to open readily. These apartments to be provided with proper means of lighting at night; and if there is not separate lighting for each water closet compartment, translucent glass panels, not less than 4 sq. ft. in area, shall be provided in the door or transoms of same.—**2-3.**

In buildings erected prior to the adoption of the code (1908), and in buildings hereafter erected where the compartment is more than one story under ground, the water closet or urinal apartment shall be separately ventilated by a window, opening to the external air, or by proper and adequate ventilating pipes, shafts or ducts, running through the roof, or to the external air, and provided for at least four changes of air for the entire compartment each hour; and all such compartments to be adequately lighted by natural or artificial light, but no window or other opening for the ventilation of such compartments shall be made to open into any adjoining room, office, workshop, factory, hallway, or compartment of any kind. In buildings erected subsequent to the adoption of the code, where there is not more than one story under ground, the water closet or urinal compartment shall have a window, not less than 1 ft. wide and of an area equal to 4 sq. ft. for a floor space of 45 sq. ft., or less, opening directly to the outer air, or into a special light and air shaft into which no other room or compartment, other than a toilet compartment, is ventilated. For upwards of 45 sq. ft. of floor space, the area of the window to be at least one-tenth of the floor area. The windows in all cases are to be arranged so as to admit of their being opened at least one-half their height. Toilet rooms of this kind on the top floor of any building may be lighted and ventilated by means of a skylight and ventilator, the area of the skylight to conform to the specified area for windows. In buildings used as hotels, office buildings and club houses, erected subsequent to the adoption of the code, or which were erected prior to this time and later remodeled or converted to any of these purposes, the bath room, water closet and urinal compartments may be ventilated by exhausting the air from the same at the rate of six complete changes of air from each room per hour, as determined by volumetric test, by approved positive mechanical means, through special air ducts to the outer air. All such toilet rooms shall have a fixed window, or windows, having a gross glass area equal to at least one-eighth of the floor area of rooms. Windows to be placed in the dividing or enclosing partitions, and so arranged as to admit of natural light from an adjoining room which has direct communication to the outside air. Artificial lighting to be provided, and the rooms to be properly and adequately lighted by natural or artificial means during the occupancy of the building.—**4.**

Water closet or urinal apartments to be thoroughly ventilated.—**5.**

Water closet rooms or compartments to have communication to the outer air by a window or air shaft, or duct, which shall not be used for ventilating any habitable room or compartment. All rooms containing a public lavatory shall have ventilation to the outer air by an air shaft or duct sufficient to provide the necessary ventilation of the room.—**6.**

Water closet room or apartment to have a window of at least 3 sq. ft., or an air shaft of same dimensions, opening directly to the external air.—**7.**

Water closet compartments to have a sash window, not less than 3 sq. ft. in area, placed so as to open, as near to the top of the apartment as possible, upon a street, yard, court or vent shaft; and provision to be made to light the compartment at night. Where necessary for proper lighting, translucent glass panels to be placed in the doors of the compartments.—**9.**

Water closet room or compartment must be open to the outer air, or be ventilated by means of an air duct or shaft.—**12.**

Water closet rooms to have window, with movable sash, open to the outer air, not less than 2½ ft. x 6 ft. —**13.**

Water closet and urinal apartments of lodging houses, factories, workshops, and all public buildings, to have a window, containing at least 300 sq. in. of glass area and arranged so as to open to the outer air. Provided, that where such buildings do not exceed three stories in height, such window may open into a well ventilated light shaft not less than 9 sq. ft. in area. If, in the opinion of the Inspector of Buildings, it is impracticable to provide a window as above, he may allow the installation of a local ventilation system, the piping for which shall be not less than 40 sq. in. in area. Cellar or basement water closet and urinal apartments shall, in all cases, be provided with sufficient light and ventilation.—**15.**

Water closet compartments must be open to the outer air, or be ventilated by means of a shaft or air duct. —**16.**

Water closet room or compartment must be ventilated. —**18.**

In lodging houses, the water closet and urinal apartments must have a window opening to the outer air; if three stories or less in height, the window may open on a ventilating shaft, not less than 10 sq. ft. in area. In all buildings, the water closet and urinal apartments must have a window opening to the outer air on the lot where the building is situated, or some other approved means of ventilation must be provided. When necessary for proper lighting, the upper part of the partitions of such apartments must be made of glass.—**19.**

EXHIBIT XI.—TOILET ROOMS—Concluded

See page 128 for Index Numbers

Water closet apartments must be open to the outer air, or be ventilated by means of an air duct.—**22.**

In all buildings, water closet apartments must have a window, opening to the outer air on the lot whereon the building is situated, or into an air shaft of at least 4 sq. ft., or some other approved means of ventilation must be provided. When necessary to properly light such apartments, the upper part of partitions must be of glass. In tenements and lodging houses, the water closet apartment must have a window, or windows, opening into the outer air, of sufficient size, all of which shall be shown on plans and subject to approval of board of health. Except that buildings of this class three stories or less in height may have such window opening on a ventilating shaft not less than 10 sq. ft. in area.—**23.**

Water closet apartments must have a window, opening to the outer air on the lot or adjacent street, or be ventilated by an air shaft not less than 4 sq. ft. in area. Where two or more apartments are ventilated by one air shaft, the area of the latter must be equal to 4 sq. ft. for each such apartment connected with same. Where necessary to properly light such apartments, the upper part of the outside partitions are to be of glass. This rule applies to urinal apartments also.—**24.**

Water closet rooms or apartments to have direct communication with the outer air by means of a window, or be ventilated by an air duct or shaft, the location and means of ventilation to be subject to the approval of the Inspector of Plumbing.—**25.**

Water closet rooms containing but one closet to be lighted and ventilated by a window, at least 3 sq. ft. in area, opening to the outer air; or light may be provided from another room by means of a tight window, at least 3 sq. ft. in area, and ventilation by means of a ventilating stack or pipe, at least 28 sq. in. in area, cross section, connected to a chimney flue above the highest opening, or extended through the roof and properly capped. For rooms with more than one water closet, light and ventilation shall be proportioned.—**26.**

Where practical, water closet or urinal apartments shall be provided with a window, but where this is not practical, a vent pipe from the ceiling of room must be carried through the roof.—**27.**

In all buildings, water closet and urinal apartments must have a window to the outer air on the lot, or some other approved means of ventilation must be provided. When necessary to properly light such apartment, the upper part of same must be made of glass. In tenements and lodging houses, water closet and urinal apartments must have a window opening to the outer air, except that in buildings of three stories or less in height, the window may open into a ventilating shaft not less than 10 sq. ft. in area.—**29.**

Every compartment in which a bath, water closet, urinal, or slop or scullery sink is situated, shall be ventilated by means of a window, opening directly to the external air, or by means of an air shaft having an area of at least 2 sq. ft. This shaft to continue, of undiminished size, to the roof and not to be used for the ventilation of any other compartment whatsoever.—**30.**

Water closet compartments to have direct and ample external ventilation, and be well lighted by means of a window having at least 3 sq. ft. net area of glass, opening directly to the outer air, or local ventilation by means of a flue of not less than 27 sq. in. section for each water closet or urinal.—**31.**

(a) Water closet rooms to be in direct communication with the external air by means of a window provided with glazed sash so arranged as to provide an opening of at least 4 sq. ft. measured in the clear, directly into a public or private space open from ground to sky, or communicate indirectly as prescribed in paragraphs b to e. No window within the meaning of this paragraph shall open into a closed porch, or covered area or driveway or directly opposite any structure nearer than 3 ft.

(b) Toilet rooms on the topmost floor of a building may be indirectly lighted and ventilated through a vertical air-shaft not less in horizontal cross section than 3 ft. x 3 ft. in the clear, which air-shaft may be covered with a glass topped skylight arranged with the sides extended above the roof and there provided with hinged glazed sash having a combined area of 4 sq. ft. in the clear, which sash shall be provided with approved metal sash openers; or the skylight may be arranged with metal louvred sides with the specified area of opening and a pivoted glass sash may be provided at the ceiling line of the room.

(c) Not more than two toilet rooms may be lighted and ventilated through a two-story airshaft with a horizontal cross section of not less than 15 sq. ft. and no dimension less than 3 ft., either open at the top or provided with a full size glass top skylight with sides extended above the roof and containing metal louvres having a combined area in the clear equal to the minimum horizontal cross section of the shaft, each toilet room opening into the air shaft through a window as provided for externally lighted and ventilated toilet rooms in paragraph a or by means of a skylight conforming to paragraph b.

(d) Toilet rooms on more than two floors may be lighted and ventilated as prescribed in paragraph c, excepting that the minimum horizontal cross section shall be increased to 24 sq. ft. with no dimension less than 3 ft., for shafts three to five floors in height, and to 40 sq. ft. and 4 ft. respectively for shafts six or more floors in height.

(e) Toilet rooms in buildings of the first class erected to the limit of height allowed by law, may be lighted artificially and ventilated by means of flues provided the following requirements are met in each case:

The flues shall be of metal, or of masonry built in form, and shall not be directly or indirectly connected with any living, sleeping or work rooms;

The flues shall be vertical, straight, with a total effective area at all points of not less than 1 sq. in. each of fresh air supply and foul air exhaust flues for each square foot of floor surface;

The fresh air intake shall be run from the outer air through adequate heating appliances, and the foul air exhaust shall be provided at the roof with a mechanically operated exhaust fan which shall maintain at all times an air velocity in all air ducts of not less than 300 ft. per minute;

Water closet and urinal fixtures shall be provided with an approved type of local vent.

(f) All toilet rooms, and water closet and urinal apartments shall be provided with suitable means for artificial lighting.—**32.**

Water closet apartments to have a window, of suitable dimensions, leading directly to the outer air; where otherwise located, the apartment shall be supplied with a suitable light and ventilating shaft.—**33.**

Yard closet structures:

To be provided with ventilating skylight in the roof, of adequate size, and with proper means for lighting the structure at night.—**3.**

To be provided with means for local ventilation.—**9.**

To be ventilated by means of slatted openings in door and roof.—**16-22.**

To be ventilated by slatted openings.—**23.**

To be ventilated by slatted openings or movable sash windows.—**24.**

General.

The general water closet accommodation of lodging houses, office buildings, or any building in which such accommodations are permitted to be used by the public, shall be so located and constructed that no offense or nuisance may be caused.—**3.**

Lighting and Ventilation.

In twenty-four of the codes, some provision is made for the lighting or ventilation, or both, of the toilet rooms of buildings, but, in two of these, the specifications have reference to the toilet rooms of public buildings only.

In two of the codes, the sole requirement is made that the toilet rooms be ventilated; in ten codes, that the toilet rooms be ventilated by a window or by an air shaft, the dimensions of which are not given; and in seven codes, that the toilet rooms be ventilated by a window, the dimensions of which are not specified, or by an air shaft of dimensions ranging from two to ten square feet.

In those codes in which the size of the window of a toilet room is specified, the dimensions range from two and one-twelfth to fifteen square feet, the most frequently mentioned dimension being three square feet.

In four codes, provision is made for the lighting and ventilation of toilet rooms on the upper floors by means of skylights, the specified area of which ranges from three to four square feet.

In seven codes, provision is made for glass panels, transoms or partitions in those toilet rooms where proper natural lighting of the rooms cannot be otherwise obtained.

In five codes, the provision of artificial means of lighting for toilet rooms is specified.

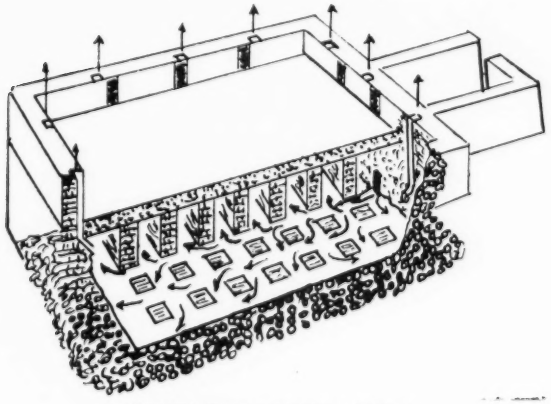
In eight codes, ventilation of the enclosures of outdoor closets, by means of slatted openings and otherwise, is specified, and in one of these, artificial lighting of the enclosure at night is required.

By reason of the completeness of the provisions of the code of the city of Washington, D. C., relative to the lighting and ventilation of toilet rooms, the same are copied in their entirety in the accompanying exhibit, with the view of showing, by comparison, the shortcomings of many of the codes in these particulars.

(To be continued.)

ANCIENT ROMAN HOUSE-HEATING APPARATUS JUST FOUND IN ENGLAND.

The discovery of extensive Roman remains at Great Chesters, on the Tyne, in England, has demonstrated the fact that the Romans two thousand years ago, enjoyed a much better system of heating houses than Englishmen do at the present time, says the "Chicago Examiner."



Ancient Roman Heating System.

By the Roman system the heat was distributed throughout the walls and floors of the house, whereas the usual British system is an open fire at which your face roasts while your back freezes, and you are liable to die of cold when you go into the corners of the room or the passages of the house.

In one of the houses at Great Chesters there is a beautiful example of a hypocaust, the name of the Roman heating apparatus. Great Chesters was the site of an important Roman military station along the great wall which the Emperor Hadrian built to keep back the barbarians, descending on Great Britain from Scotland. The house was that of the Roman military commander.

Hot air was generated by a circular furnace, which heated water and gave out streams of hot air into the hypocaust, which was a chamber under the ground floor of the house, containing arrangements of hollow tile pillars called "suspensurae."

From the hypocaust the hot air was distributed throughout the building by a series of wall and floor flues, giving an even temperature throughout the house.

This system was invented shortly before the time of the Emperor Augustus, who reigned from 27 B. C. to 14 A. D., and was soon adopted not only in public baths, but in private houses.

It is surely a wonderful fact that those ancient Romans nearly two thousand years ago, on the very confines of the habitable world, in northern England, introduced this scientific system of house-heating, which the modern inhabitants of the island have not been able to approximate even remotely.

A HUSTLING MASTER PLUMBER.

The plumbing business of W. F. Buckley at Scranton, Pa., has been developed at a rapid pace through the personal aggressiveness of Mr. Buckley. The accompanying illustration shows shop and display room occupied by the business, with the proprietor, Mr. Buckley, seated at the desk. The appearance of this establishment is that of an absolutely up-to-date concern.

Interior View of W. F. Buckley's Plumbing Establishment at Scranton, Pa.

A Tough Bird.

Kerrigan went on a trip to South America, and while there bought a present for Dennis in the shape of a pretty Spanish parrot, which was shipped to Dennis. When he got back home he said to Dennis:

"Dinny, did ye get the foine parrot Oi sent you?"

"Oi did that, Kerrigan, and Oi wants to tell ye that I never put me teeth into a tougher bird in me life"—Sanitary Pottery."

THE EFFECT OF HOUSEHOLD GREASE AND OILY WASTE UPON SEWERS.

By Wm. Hutton, of New York.

Read Before the Seventh Annual Convention of the American Society of Inspectors of Plumbing and Sanitary Engineers.

I have not had in my work any extensive opportunity of studying the effect of grease or oil upon the walls or sewers of either brick or concrete construction, but if by "effect" is meant deterioration then I venture the opinion that there is none, or if there is any that it is insignificant. I base my opinion on observations made of runways and troughs in woolen factories where waste water containing considerable quantities of oily matter, mostly organic fats and oils, have been in contact with cement concrete for years with no apparent effect on it.

If "effect" be construed to mean the increase in liability to stoppage that the entrance of fat or oils to a sewer is likely to cause I am again of the opinion that it is to a great extent negligible. That is not to say that the proper conditions cannot be obtained that will cause stoppage. It is simply that these conditions should be avoided if possible.

In this matter I can talk from experience if for sewers are substituted house drains. About the year 1894, I as a boy assisted the engineer of the Sanitary Protection Association of Scotland in the testing and inspection of the drains of a number of large residences. At that time the danger that was supposed to be present in sewer air was causing what might be termed a sanitary revival. The installations of drains made under the direction of the Sanitary Protection Association in all parts of the country were most elaborate. It was the era of manholes and inspection chambers, these being built of white enameled brick in many cases. As the practice in residence work is to get the soil and waste pipes to the outside of the house by the shortest possible route, iron and lead being used for that part inside the building and then tile pipes collecting all the branches into a main line which is trapped before it leaves the building lot or before it enters the cesspool or septic tank, it follows that there are many bends and at that time there were many inspection chambers and many manholes at those bends. It was my part to go down into these chambers and to view the interior of the tile drains with the aid of a mirror and candle. The fear of the so-called deadly sewer air was so great that periodical tests were made of most drainage systems to ensure that it was not finding its way through cracked joints into the houses. Therefore, I had the opportunity of seeing drains once a year for a number of years at least, and to know exactly how every part of them was affected by time or by the passage of wastes through them. I cannot say that I ever detected the slightest deterioration in the vitreous ware and the smoke tests did not show at any time any leakage in joints that could be attributed to anything but settlement. The deposit on the walls of the drains was remarkably little and this leads me to conclude that it can be avoided almost entirely by proper grading and by careful workmanship.

It may be interesting to you to hear that the men who laid most of the house drains I helped to test took exceptional pride in their work. Every hub was laid on a brick embedded in concrete. Every joint was made with a strand of rope yarn soaked in cement pushed into the joint first. Then the cement was put in and when almost hard it was drawn around with the trowel until there was a certainty that it would stand up under test. Bent lengths of tile were rejected and a true grade was laid out with the aid of chalk lines and tee squares. The result was that when a light was lowered through a lamp hole and a mirror held in the inspection inlet the whole bore of the pipe could be seen. What conclusion may be drawn from this? That the smooth bore of the drain did not encourage collection of sediment at any place, that the careful grading secured the greatest velocity of flow with the pipe running full enough to carry out nearly all of the grease or oil with the flow. That the small deposit that did remain did not solidify but was acted upon bacterially and did not increase in thickness. Therefore I conclude that most stoppages are due to badly made joints, rough projections into the bore which act to collect sediment and to hold grease in quantities larger than can be broken up in the short time that elapses between discharges into the drain and that the building up of grease would be more liable to arise from this than from chilling on the walls of a conduit. It is seldom that a soil pipe or house drain carrying greasy wastes chokes when it is laid at a pitch which ensures the maximum carrying capacity of the pipe and is laid with easy bends and no crooks or kinks at the joints. The oils of a vegetable or mineral origin may have some effect on vitreous tile or concrete, but I cannot think that those which generally find their way into a public sewer will affect it to any extent. The acids from manufacturing operations are more likely to eat away the surface of a concrete sewer and I think that, all things considered, the oils or fats are rather beneficial than harmful in such a case as they tend to nullify the harmful effects of acids. I think that if careful grading and workmanship are insisted upon, there will be little deposition of grease that the natural action of the bacteria inherent to wastes of an organic nature cannot keep in check and that when the balance is reached where the increased activity of the bacteria prevents the increase of the deposit to any considerable thickness it will not solidify or saponify and my early observations of the condition of house drains bears this out. Moreover, as I believe these drains are still in first class order after nearly twenty years use the painstaking care of the men who laid them has been well rewarded and goes to prove the value of knowing how and doing it.

BUSINESS CHANGES.

Jasper, Ind.—The interest of Louis J. Gasser, in the Jasper Roofing & Plumbing Co., has been purchased by Harry C. Aberg. The firm will hereafter be known as the Jasper Plumbing & Heating Co.

Dodge Center, Minn.—Emil Lehman has sold his plumbing establishment to Geo. Kaufman, who has been in his employ for some time, and who is an experienced plumber.

Granite City, Ill.—The plumbing establishment of W. P. Southwick has been purchased by William Bergner, of this city. Mr. Southwick was the first master plumber to locate in Granite City.

Hannibal, Mo.—On account of poor health, Albert Schultz has sold his interest in the plumbing business conducted by Schultz & Siebel to his partner, Edward L. Seibel. Mr. Schultz will leave for the west in a short time.

Wadena, Minn.—J. E. G. Robb, of the plumbing firm of J. M. Robb & Co., has withdrawn from the firm and will devote himself entirely to his work on the road as the representative of the Central Supply Co., Minneapolis. The firm of J. M. Robb & Co. will be continued as formerly.

Heating in Turkey*

By Professor John R. Allen, p. t. Constantinople, Turkey, President of the American Society of Heating and Ventilating Engineers.

To understand the business conditions in Turkey it is necessary to have a little insight into the Turkish character. The Turk is a fatalist; everything that happens in Turkey is the will of Allah. The Turk builds a house of wood and paints it. The paint wears off, the boards begin to rot and finally fall off, but no repairs are made, because it is the will of Allah that all things should decay and pass away. This fatalistic belief of the Turkish people is seen on every side, and is a most difficult thing to contend with in business life. It is one reason why the Christians have done so much better in business than the Mohammedans. In fact, most of the business of Turkey is done by Christians, and it is a recognized condition, true everywhere throughout Turkey, that the Turk steadily becomes poorer and loses ground to the Christian. There is a very good reason for this: the Turk has always been a warrior, and business life and methods have little interest for him. In the old days he waited until his Christian neighbors acquired property and wealth and then he took it away from them. It is to be hoped that under the new rule of the "Young Turk" pillage and massacre may be done away with. But with the new policy of Turkey, the Turk must learn entirely new business methods or eventually take a very subordinate place in the Turkish business world. It seems almost inconceivable that the Turk, with his fatalistic ideas and his lack of business training, could establish new business conditions.

On every side there is evidence of these changing conditions in Turkey. New houses are being erected in all the cities and villages. In Constantinople new office buildings are being constructed, and many new ones are being planned. These buildings are being equipped with modern appliances, and many of them are quite up to date in their equipment. The main streets of the city, formerly seldom more than 20 or 30 ft. wide, are being widened. In the residence district of Pera a boulevard has been constructed with asphalt pavement and elaborate parking. Concessions for telephones, an electric lighting plant and electric car lines have been granted and the construction of these works is now in progress. A new bridge across the Golden Horn has been completed and is provided with street railway rails and electric lights. The present sewerage system is very inadequate, and is now being enlarged and extended. These new sewers are being made of brick and reinforced concrete, and take the place of the old sewers of rough slabs of stone. All of these improvements would have been impossible under the old régime of Abdul Hamid, but the policy of the new government is to encourage modern developments. The Turk is being rapidly educated to make use of the luxuries of modern civilization, which we consider necessities, such as telephones, electric lights, elevators, modern plumbing and central heating.

The Turkish houses are, as a rule, built without provision for any form of heating. There are no chimneys in the ordinary Turkish house, and many of the houses being built today are still constructed without chimneys.

*Read at the semi-annual meeting of the American Society of Heating and Ventilating Engineers, held at Detroit, Mich., July 11, 12 and 13, 1912.

The forms of heating used in the ordinary Turkish house are such as do not require a chimney; the same is true of their means of cooking, which is ordinarily done over a charcoal fire. The fire is started in a pan out-doors, and when the coals are burning well, they are brought into the house and placed on a grate held by a brick or stone shelf. A separate fire is made for each cooking utensil, and, for an elaborate meal, as many as ten or twelve separate fires are used. The American cook-stove is unknown in Turkey. What a field for some enterprising American stove concern! How many times Mrs. Allen has expressed a wish for a good American cook-stove.

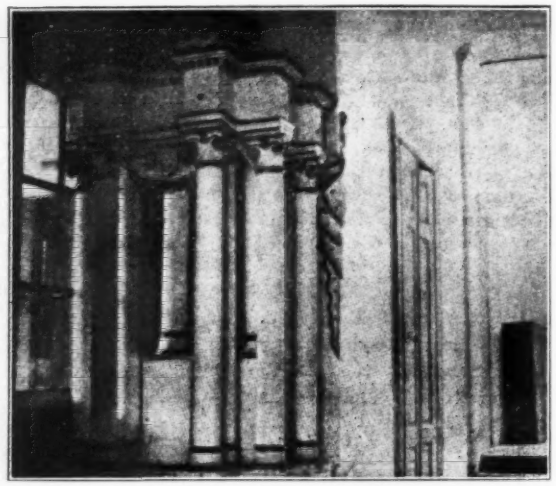
Old Turkish Mongol, Made of Hammered Copper.

Our present cook-stove is one made by a Levantine Italian, and embodies all the wrong principles known to stove making. With much effort and consumption of fuel it can be made to boil water, but to bake—never!

The heating in the Turkish houses is done with open charcoal fires. In the better houses these fires are made in elaborate mongols. These mongols are usually made of copper or brass, and are raised from the floor on a standard or on legs. They look much more like jardinière stands than like stoves. The fire is started out of doors, and when it is burning brightly is brought into the house and put into the mongol. It will burn for an hour or two without replenishing. We sometimes use one in my office, but it is a very poor substitute for a steam radiator. The poor people make a mongol by taking an oil tin, removing the top, and then running rods through the tin about 2 ins. apart and 3 ins. from the bottom. This forms a grate upon which a charcoal or coke fire is made. A small hole is cut in the tin below the grate to form the ash pit door and give draft to the fire. A complete heating plant can be produced in this way for an expense of not exceeding 10 cents. Most of the workmen use this system of heating for their houses and shacks. The system has one good feature: its efficiency is 100 per cent.

Grates are very little used in this country for two reasons: coal is very expensive, and the native workman

has never learned how to construct a grate properly. The most popular form of heating is a stove—usually one that will burn either coal or coke. These stoves are, for the most part, what are known as air-tight stoves and are made in Belgium. The American air-tight soft-coal stove should find a good market in Turkey. The wealthier families often use the German tile stoves. These look very well, and are often quite large, reaching almost to the



Russian Stove to Heat the Hall of a Large House Belonging to a Pasha.

ceiling. They heat up very slowly, but retain the heat for a long time. The use of them is diminishing, however, as they require too many repairs.

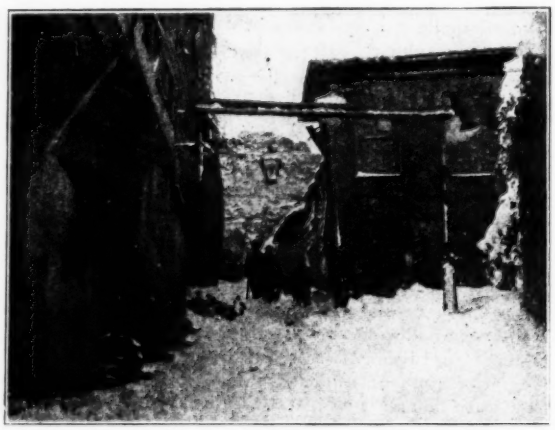
The most elaborate stoves are from Russia. The first time that the writer saw one of these stoves was in an old Turkish palace, which had two of these stoves in the entrance hall. At first they were thought to be some sort of a shrine at which the family worshipped, or, perhaps, erected in commemoration of some departed member of the family. On closer examination we found that the supposed shrines were hot. They consist of a central portion made of cast iron, in which the grate is located. The flames pass up through this central flue to a cast-iron chamber, which forms a manifold. From this manifold cylindrical pipes are carried down to a cast-iron base under the firebox, to which the smoke flue is attached. There are some ten or twelve small round pipes, elaborately decorated in white and gold in this case, which carry the gases from the upper portion of the stove to the base. The whole appearance of the stove is not unlike a shrine, as the upper part of the stove is covered with numerous ornamental domes and turrets. These look less like heating apparatus than anything the writer has ever seen. Occasionally one sees an American or English wood stove, but only in houses of European families.

A great many of the older buildings are now being heated by stoves, and, not having chimneys, the stove-pipes are put out through one of the windows and the pipe is carried up the side of the house, sometimes over the street. Along the Bosphorus, in many places, one may see soldiers' barracks, and even fine palaces of marble, with numbers of stove-pipes reaching out like long, black tentacles from many windows and extending above the roof. To a European they look most grotesque, and quite inconsistent with the building architecture.

In the business section of Constantinople, a number of office buildings have been built recently and these buildings have been provided with central heat. In every case I think the system is operated with hot water. Steam heat has been very little used in Turkey. These hot-water systems have been installed by either English or German contractors. The systems, as a rule, have a very crude piping system, much more complicated than necessary, and the pipes are quite small. Fortunately, not much heat is required in Turkey, and poor operation is not so noticeable. There is one very desirable addition that is made to almost all European steam or hot-water heating plants, and that is the providing of a valve for each radiator which controls the amount of heat given to the radiator. In the United States the use of a controlling valve by which part of the heat may be turned off the radiator is very limited, but in Europe the use of such a valve is the rule. There is a great lack of heating contractors in Constantinople. There are only two concerns that can really construct a good heating installation in this city of over a million inhabitants, and in a climate where heating is necessary from November till May.

Central heating in Turkey has been limited almost entirely to the heating of public buildings. The Turk has yet to be educated to heating his residence by central heat. There should be a large field for the hot-air heating system, but as yet this system is unknown in Turkey. In some respects it would be most desirable for this country. It is inexpensive, can be easily installed in a wooden house (and most Turkish houses are of wood) and heat can be quickly obtained. This year we hope to install some of the first hot-air systems of heating in the new residences to be built on the Robert College grounds.

The heating of a number of buildings from a central heating plant has not yet been done in Turkey. There are, however, two plants of this kind being installed, one at Arneautkeuy in the American School for Girls, and the other which the writer is installing at Robert College. There are a number of institutions in the country which will undoubtedly be supplied in the future with central



Stove Pipe Running Across the Street, a Common Sight in Turkey.

heating systems using the exhaust steam from their electric light plants. As German and English heating engineers have had very little experience in this line, the American engineers have by far the best opportunity to take up work of this kind.

The American manufacturer has done but very little to push his trade in this market. It will not be difficult for him to compete with Europe, as the prices are much higher

here than in America. Freight rates from England and Germany are almost as much as those from New York. The freight rate on machinery from London to Constantinople is 25 shillings per ton, and from New York to Constantinople 27 shillings per ton. Railroad freight rates are so high that shipping heavy freight from western Europe to Costantinople is never thought of, and shipping by rail here is looked upon in the same way as shipping by express is at home. As an American citizen, the writer should rather see American supremacy in commerce and industry than that the United States should own a piece of the North Pole, or an island in the South Sea. The business invasion of such countries as Germany, England and France is a difficult matter, as their business conditions are firmly established, but Turkey offers a free field, and by systematic effort this market could easily be persuaded to purchase American goods. America has strengthened her position in the last few years by having a more efficient and active consular service. Our consul and vice-consul in Constantinople have a thorough knowledge of the people and speak the languages. A proper co-operation of our American business men with the American consular service will do much to increase our foreign trade in countries such as Turkey.

DEPRECIATION IN UNDERGROUND DISTRIBUTION SYSTEMS.

By Mr. William Jennings, of the Harrisburg Steam Heat & Power Co., Harrisburg, Pa.—Paper read at the Fourth Annual Convention of the National District Heating Association, Held in Detroit, Mich., June 25-27, 1912.

The question of "depreciation" in any business is one that we would all like to forget, but, like death and taxes, is bound to come due, and must be paid sooner or later.

The writer's observations are not technical and are principally confined to the plant with which he has been connected for 23 years, or two years short of the life of the company itself.

Just what part of the Underground System is most subject to depreciation is quite hard to determine, as experience and investigation have led me to believe that a properly installed plant will last 25 years, and if not disturbed an indefinite time longer.

Probably a short account of our own experience would be of value, as we know the methods of construction used in the early installations have been improved upon very considerably.

The Harrisburg plant was installed in 1887, the underground work being placed in a gravel and loam sand soil, having one line of the pipe placed in the center of the ditch, underneath the steam main. The wood log was bored out of the solid log, male and female ends, rolled in tar, laid without paper over the joints. Bar iron straps were carried along the entire line for anchoring. Good charcoal iron "line pipe" for steam mains was used, and expansion and contraction provided for by means of expansion devices known as variators. The service pipes were taken out of the bottom of mains on the original installation, but changed later. The plant has been in successful operation ever since.

In 1907, owing to increase of business, principally on a street that had developed beyond the expectation of any one, and by the excessive pressure necessary on the street mains, it was decided to enlarge part of the underground system by taking up the smaller main and re-laying with a larger one.

The old line was laid in a loam sand and soil, it was found that the wood pipe casing, while charred on the inside to a possible depth of an inch, was solid and, except where a water pipe or sewer had leaked on it, was in a good state of preservation, except where the ends were exposed in the brick work at the variators. The iron pipe had no leaks and showed bright and clean, the only sign of wear being a slight depression on the bottom side of the pipe, which, however, was negligible in considering further life of pipe.

The same conditions were observed in later changes, the last being in the summer of 1911. Part of this last operation was in gravel, and here the wood pipe was in most excellent condition. We still have 12,650 feet of the original installation, including the variators; and while the line of pipe may be more easily followed when the snow is over it than the later installation, yet we do not find the depreciation in efficiency is enough to warrant us thinking about changing the old for the new. The greatest trouble from leaks we have experienced in the last five years has been the leaking of service pipes, and in the experience of the company we have not had more than five or six leaks in the steam mains proper. On account of the sulphur in the feed water we have had considerable action of (static) electricity in our system, from which we expected trouble, but at this writing we see no evidence of any. We found the drain tile in the gravel soil open clear, and in the loam soil some little of the tile was closed entirely and others partly so. In all our later installations care has been taken to surround the drain tile with adequate porous material so that perfect drainage is assured.

Our experience has been confirmed by other plants in our vicinity and by careful investigation made by interested parties.

From the above experience you see that the original method of construction will permit of a very low charge of between 3 and 4 per cent for "depreciation" of "underground systems," the amount depending on how this charge will be invested. For the system put in during the past five years, the better under-draining, better insulation, better designed expansion, better designed expansion devices, and all the experience the several contractors have had, leads me to believe that the figures above named for depreciation can be lowered by 20 per cent, and still leave you a working plant of fair economy.

Of course, you always have the possibility of sufficient increase in business, that the mains installed may become too small for economical operation, and in order to take care of this feature, would say that a charge of from 4 to 5 per cent, of the cost of the Underground System would be sufficient for the item of Depreciation and Re-placement.

Columbus, O.—This city may now get public comfort stations after all. Thwarted in a half a dozen different plans, a new one is under consideration that seems feasible. The first plan tried provided for joint tactics by the state and the city and their location in the state house grounds. The legislature defeated a bill to that effect, but later on another legislature passed such a bill, but by some clerical error it failed to become an effective law.

A Hard Job.

Mr. Littleshrimp—"Professor, I want you to take my son in hand and make a man of him."

Professor—"I'll do the best I can, but don't you think you're skimping me on the material?"—"Chicago Daily News."

What the Law Decides

Recent Court Decisions of Interest to the Plumbing and Heating Trade, Handed Down in New York, Nebraska, Georgia, New Jersey and Missouri

No Action Maintainable on Plumbing Contract by One Not Licensed.

In an action brought to recover for labor and materials the plaintiff was permitted to introduce evidence as to three separate agreements for plumbing work. This was objected to on the ground that the plaintiff was concededly not a duly licensed or registered plumber, and had never received a certificate of competency from the examining board of plumbers, as required. It was also at the close of the case moved to strike out all of the testimony in support of the plaintiff's several claims for plumbing, on the ground that the contracts were illegal, and the plaintiff could not maintain an action based on such contracts. And that motion was denied, which the Appellate Term of the Supreme Court of New York holds was error. It has been repeatedly held, the court says, in Israel vs. Wilson, 134 New York Supplement, 536, that an action cannot be maintained on contracts of this character, where the contractor is not a duly licensed or registered plumber, or has not obtained a certificate of competency as required by the statute.

When Goods Ordered from Non-Resident Corporations Are Refused.

A purchaser who by a valid written contract induces a non-resident corporation, in compliance therewith, to deliver to a carrier for shipment the goods purchased, and attempts, without cause, to rescind the purchase while the goods are in transit, the Supreme Court of Nebraska holds, in J. K. Armsby Co. vs. Raymond Bros.-Clarke Co., 134 Northwestern Reporter, 174, will not, in an action for damages for refusing to accept the consignment, be heard to assert that the corporation has not legal capacity to sue. And where, for example, the purchaser of goods delivered to a carrier in another state for shipment to a designated point absolutely refuses, without cause, while the goods are in transit, to accept them anywhere, under any circumstances, it is necessary for the seller, after diverting them to another point for storage and resale, in a suit to recover damages for breach of the contract, to allege and prove that the goods were tendered to the purchaser at the original point to which consigned. After goods have been sold and delivered to a carrier for shipment, pursuant to a valid contract in writing, the purchaser, in the absence of the seller's consent, cannot rescind the purchase on account of a financial depression alone, without incurring liability for resulting damage.

Rights and Duties of Purchases by Samples.

A case is thus stated by the Court of Appeals of Georgia: A. bought from B. goods according to samples exhibited. When the goods were subsequently delivered, A. on inspection notified B. that the goods were not according to contract, and were rejected, and were held subject to B.'s order for re-shipment or other disposition. B. declined to retake the goods, insisting that they were in accordance with the warranty. A., therefore, placed the goods in his storehouse, and, B., continuing his refusal to retake them, the goods being of a perishable character and liable to deteriorate in value by being kept on hand, A. sold them in the market. The court holds, Salant & Salant vs. Dannenberg Co., 73 Southeastern Reporter, 426, that (1) A.'s conduct did not amount to an acceptance of the goods, or a waiver of his right to recover damages for breach of the contract. (2) It was A.'s duty to use due care in preserving the rejected goods after B.'s refusal to retake them, and also to minimize the eventual damages. The court says that it is well settled that, where goods are sold by samples exhibited, an express warranty arises that the goods subsequently to be delivered will be of the same quality as the samples, and that upon receipt of the goods the buyer is not bound to inspect before acceptance; but if, upon receipt, he does inspect, and discovers defects before acceptance, it then becomes his duty to reject them. If after knowledge of the defective quality, he retains the goods and deals with them as his own, that will be an acceptance and a waiver of the defects discovered.

No Prescribed Period for Use of Brand.

The Court of Errors and Appeals of New Jersey holds, in Taylor P. Co. vs. Edwards, 81 Atlantic Reporter, 1120, that there is no arbitrary period during which a brand must be sold and advertised to entitle the owner to an injunction against imitators, but the question of time is always one to be considered in connection with all the facts of a given case.

Meaning of Order Providing for Shipment "At Once."

The Springfield (Mo.) Court of Appeals says, in Bowser vs. Atkinson, 143 Southwestern Reporter, 75, that the term "at once," "forthwith," or any similar term when used in a contract for the purchase of goods, to designate the time when the goods are to be shipped has a more restricted meaning than the term "reasonable time." The court does not think that it should be held to mean a time simultaneous with the execution of the contract, for that would often be impossible; but that it does mean, in the absence of anything to qualify it, that all reasonable haste consistent with fair business activity should be used in filling the order and making the shipment.

FACSIMILE OF POSTAL CARD USED BY TEXAS PLUMBING FIRM IN GOING FOR BUSINESS.

We extend to you a cordial invitation to inspect our show rooms, where we have on display a full line of everything pertaining to Plumbing, Heating and Electric, also Vacuum Cleaning Devices, Gas Stoves, Ranges, and Water Heaters.---We can supply the wants of the most exacting who demand exclusive designs, first quality, and superior workmanship, as well as those looking for the best value in moderate priced fixtures.

We are prepared to submit plans, specifications and estimate for your approval.

We employ a force of experienced mechanics and exert every effort possible to see all work done is correctly and satisfactorily executed.---Our policy is absolute fairness to our customers, the correction of errors without quibbling or taking advantage of technicalities.---Your interests are ours and your satisfaction our best advertisement.

We ask prices that give us a profit and that enable us to give you work on which you can always depend.

Soliciting your business and hoping you will honor us with a visit to our show rooms in the near future, we remain.

Respectfully,

San Antonio, Texas — BRADEN-O'NEILL CO.

THE HEATING MAIN.—VIII.

That particular customer seemed to me to be about the crankiest ever. He was that sensitive about angles and observations that he would not have a radiator valve in the room. This, of course, happened several years ago when any new or unexpected idea was liable to throw the poor steamfitter into a severe course of nervousness. So as this party could not endure the sight of the radiator valves in the room, the branches were so run in the cellar that each radiator was controlled by a gate valve and any radiator, or several, could be cut out as the case called for, or as might be desired. While such a manner of connecting was not very common, it had a decided advantage if it ever became necessary to repair the radiator, or any part of the pipe that led to the radiator, that was located on the far side of the gate valve.

Another party objected to having air valves on the radiators of the hot water installation in his residence, and so the lines were run in a manner that the air might work out into the expansion tank as the water rose in the system. I have seen the most expensive radiator valves upon the market practically ruined, as far as the looks of them were concerned, by the utter ruthlessness of some steamfitter who knew no better than to apply a pipe wrench to the valve when he made the connection.

Valves that any manufacturer would be proud to show up as the best of his line were "chawed up" in this manner. If there is any lesson that should be most thoroughly impressed upon the mind of the apprentice, it is that no pipe wrench should be applied to brass work. In connecting the radiators to the pipe which will furnish the medium to bring the heat to that point, there are several different practices of differing merit, but the main idea is the same and that is the avoidance of traps, to have the pipes so that they are easily accessible in case of the need of repairs, yet not to have an unnecessary amount of piping and fittings showing.

Mechanically connected does not mean muchly connected and that is the thought suggested when one views the unnecessary nipples and ells that are sometimes used in these connections. Study the simplest form in which these connections can be made that is consistent with the expansion, and endeavor to do away with all unnecessary fittings. Put on only what are required so that the radiator will not be lifted or dragged.

On a rising line from which two radiators are to be supplied at a point directly opposite, it is unwise to "bull-head" a tee and thus to supply the radiators from opposite sides; yet this very thing has been done hundreds of times. Use a tee and an ell, or perhaps two tees in case that the line is to be carried higher, setting the ell over the tee by a short nipple and connecting to the radiator by shortest method out of the side of the tee, the ell being treated after a similar fashion. I object to seeing a pipe run under the radiator, and the valve connection being made at the far end. It is a clumsy looking job at the best and should be used only when absolutely necessary which can be avoided three times out of five if some forethought be exercised.

On hot water work for the radiators in the stories above the first, it will be found most convenient to connect same by means of what is known as the top and bottom method. This makes a better looking job and one that does away with many of the crooks and turns that would be otherwise used and gives a far better chance to pair the pipes in the rooms below. It also does away with all the work under the floors, a point of no small consideration on any job, either steam or hot water. Many times there will be a leak at the point where the tail piece of the radiator valve enters the radiator, or the bushing at that point, as the case may be.

On general principles these leaks do not come from defects in the material, but from the carelessness of the fitter who will persist in sticking the handle of the pipe wrench into the tail piece of the radiator valve and thus making the joint, instead of making use of the regular nipple holder for this purpose.

It is better to pack the stems of the radiator valves at the bench, at the time that the radiator valve is made on to the stub, as then you do not have to make a second trip all over the works. One should not trust to chance as to the stems of the valves being packed correctly.

So at last our heating main is in place. It lacks, yet, a few final touches and must then be tested. Fire up the job and see how it pans out. Don't be surprised if, in spite of all the care that has been taken, there should happen to be two or three small leaks. If they are merely on the main or some of the branches in the cellar they will do little harm for the present and they may "take up" entirely on the second or third firing of the job.

If this does not prove to be the case, it has already been explained just how to stop said leaks. We come now to that part of the job which is generally rushed off with the greatest of haste and if there is a cheap man, or idle helper, this duty falls to him. I refer to the covering of the pipes and fittings.

In the series of articles that I wrote regarding "The Setting and Fitting Up of Boilers" I gave a pretty thorough description of how to mix, manage and apply the loose asbestos, so that does not need to be gone over again at this place. In past days I have seen the pipes covered with asbestos paper. It was held in place by being pasted or wound with string. A couple of thicknesses of this asbestos paper were used, over which some much heavier paper was either pasted or held in place by cord wound on.

This made a very convenient covering and one that could be easily applied, but it could not be considered as thorough for preventing the radiation of the heat as is the regular commercial covering. The pipe covering will probably arrive on the job in crates. Allow it to remain in the crates until the time comes for using it, merely opening one end of the crate for the purpose of seeing if you have all the covering that you ordered. Sometimes the order seems to have gotten twisted and it is best to check up the covering as soon as it arrives on the job. When it is desired to use the covering it can be taken from the crate as is necessary and time will not have been consumed uselessly in storing it somewhere. Also, on general principles, the less the covering is handled, the better it is for all parties concerned.

This commercial covering will come to you in lengths of three feet each. There are various kinds and qualities of same and it depends upon the wording of the contract as to which kind you are to apply to this job.

In case that it is desired to cut any of the pieces any certain length a dull hand saw will be found the most effective tool to do it with. The cleaner that you can keep yourself and the cleaner place that you can find for this work, the better the covering will look when it is finally on the pipe. Therefore, cover the work bench with some heavy paper or cloth or else make another rough bench at some other part of the job. You want a good brush for the purpose of applying the paste to the canvas of the covering. Now strip back the canvas from the

piece and make a liberal application of the paste after which fold back the canvas as it was in the first place and get ready another piece for the man who is putting the covering on the pipe. Try to keep your hands clean while doing this. Have a pail of water handy for this purpose as the hands soon get very dirty and will daub up the white covering to a great extent unless you are careful.

If the main is too high to be reached from the floor, a light step ladder will be about the easiest and quickest thing to use in getting to the desired points. The man who is placing the covering on the pipe should see to it that the lap of the canvas comes at the top of the pipe as nearly as is possible, as it makes a much smoother looking job and does not show the dirty streaks where the hand has smoothed the pasted canvas to its place. Should the covering be painted (and it should in order to make a better looking job) the dirt will, of course, be covered.

The brass bands should be put on the last thing. It is not desirable to put them on and then have to change them again and after the covering is all done and the fittings are covered, the bands can be spaced off more evenly and to better advantage. There are special coverings for the fittings and these are used in many places. Some fitters, however, prefer to cover the fittings for themselves with the loose asbestos.

If the asbestos is to be applied by the fitter, it should be put on while the fittings are hot. A good job can not be made in any other way. It will also take two coats of asbestos to make a successful covering.

I have seen it "wopsed on" by hand and the canvas stuck on while all was green. Two days later that joint covering would be warped and twisted about like some Egyptian mummy.

After the covering is all in place it should be painted with paint containing a good body of lead, and when this is dry, the brass bands may be applied and you can then call for an inspection.

To cap the climax, you may have done an extra good job; yet, there is liable to be a good kick coming from the boss. Some of them seem to have a chronic grouch on the subject of covering and regard the time spent in this direction as good as thrown away. Many make the covering of the pipes an "extra" and then it is the customer who registers the kick. Just the same, if you are not allowed to put the covering on as it should be, tell the boss to put some one else on the job.

Phoenix.

NEW SOLDER SPECIFICATIONS.

New standard specifications for solder have been submitted to the American Chemical Association by H. J. Skinner, of Arthur D. Little, Inc., acting as chairman of a general committee. In regard to the proposed specifications, Mr. Skinner's report says:

No attempt has been made to cover special solders, since their composition is necessarily dependent upon their specific uses and the total amount used is small as compared with the more common types. The requirements for fine solder were formerly and are now in many cases 50 per cent tin and 50 per cent lead. Careful service-tests carried out by a very large consumer of solder have clearly demonstrated that a solder containing 45 per cent tin and 55 per cent lead is entirely efficient for general service, while the cost is materially less. The composition specified for wiping solder is practically standard among all large users of this material.

As specifications of this nature should be adapted to the needs of the greatest number, an attempt has been made to insert such requirements as would garantee a satisfactory product, but, at the same time, not needlessly limit the method of manufacture. Copper and zinc have been entirely prohibited, as the former affects the flowing qualities while the latter produces brittleness. Antimony, however, up to a small percentage, is not detrimental and has not, therefore, been entirely prohibited. The other common impurities are not harmful if present in but small amounts. The requirements, therefore, allow the presence of metals other than lead or tin (excepting copper and zinc) up to 0.5 per cent. It is the opinion of the committee that this will allow the use of old metal of a suitable nature, but will prevent careless manufacture r wilful adulteration.

The solder desired under these specifications is a homogeneous alloy of lead and tin, uniform in composition, containing no zinc or copper and as free from every other substance as possible.

Rosin flux solder shall consist of a shell of solder in the form of a wire, containing a core of rosin flux. Mineral and other non-resinous fluxes shall not be used.

The quality of the material used and the methods of manufacture shall be such as to insure for the completed solder the properties called for in these specifications.

Requirements:

1. The composition of the various solders supplied under these specifications shall be as follows:

Quality of solder.	Minimum per cent of tin.	Per cent of lead.	Maximum per cent metallic impurities other than copper and zinc.
Fine-solder (bar-solder)	45	About 55	0.5
Wire-solder	45	About 55	0.5
Rosin-flux wire-solder	45	About 55	0.5
Wiping-solder	40	About 60	0.5

2. The rosin core used in rosin-flux wire-solder shall be of commercially pure rosin and shall form not more than six per cent nor less than three per cent of the total weight of the finished product.

Inspection: Each shipment shall be inspected and weighed. Drillings taken from any portion of each lot of solder shall be analyzed and the results of the analysis shall be considered to represent the composition of the lot.

Analyses shall be made in accordance with the standard method attached to and hereby made a part of these specifications.

Method of Shipment: The completed solder shall be furnished in such form and weight and with such marks as may be specified.

Failure to Meet Requirements: Any shipment which fails to meet the requirements hereinabove specified may be rejected and returned, the contractor paying freight charges both ways.

Cheyenne, Wyo.—Contract for the plumbing, heating and ventilating of the Citizens' bank building has been awarded to Johnson & Davis, of Denver. The contract price is $11,500.

Champaign, Ill.—The Carson-Payson Co. has received the contract for the plumbing and heating of the new St. John's church.

International Falls, Minn.—Doran Bros., of this city, secured the contract for the heating and ventilating of the new high school building at a figure of $20,000. The plumbing contract was awarded to Adamson & Co., of St. Paul, for $6,711.

QUESTIONS AND ANSWERS

A QUESTION ABOUT CHECK VALVES ON WATER SUPPLY SYSTEM.

Editor "Domestic Engineering":—A customer of mine built a home and the water pressure was not quite enough to reach his home by 60 feet. I ran a 1¼ in. pipe to same and put in a pneumatic tank, and pumping direct from the 1¼ in. pipe by electric pump, what size engine should it be? The electric contractor put in only ⅓ h. p. engine with ⅜ in. outlet. I also put in a check valve ahead of the water. What kind of a check should this be, and if same is correct, should this check be ahead of the water or back of it? Do you think the back pressure would be great enough to open check, is the city pressure too great to open same? Please give me advice on the above.

Alexandria, Va. D. W.

As the details given by D. W. are meager, we venture to answer his question in a general way.

The electric contractor has, no doubt, put in the pumping outfit recommended by the manufacturer of whom he bought the outfit, and in all probability it is of proper capacity. A swing check should be placed between the pump and the tank and also in the suction pipe close to the pump. Any good swing check will fill the requirements. A gate valve should be placed on each side of the pump to allow shutting off in case of repairs to the pump. There is a possibility of the city pressure being strong enough to open the check, as the check valve will be so placed as to permit the water to flow from the city pipe into the pump, but the pressure raised by the pump will close the check valve, and the higher the pump pressure, the tighter the valve will close. D. W. will see that a check valve will not open from either end, if he stops for a moment to think how a check valve operates. He does not state how this outfit works, as we presume he has it in operation.

WHICH IS THE MOST SANITARY PLUMBING SYSTEM.

Editor "Domestic Engineering":—I send you two sketches of roughing in of bath room and kitchen sink,

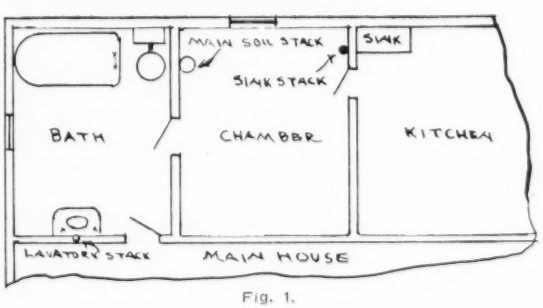


Fig. 1.

also floor plan. Please advise which is the more sanitary You will note that neither sketch has direct vent for bath tub trap. In sketch No. 2 it has wet vent through lavatory waste. In sketch No. 3 a 4 x 2 sanitary Tee is in the main stack for outlet of bath tub trap.

Dallas, Texas. B. J. H.

Our opinion is that Fig. 3 is the best installation, as it gives each fixture practically a separate branch from the main soil stack.

In Fig. 2, if a stoppage should occur between the 2 in.

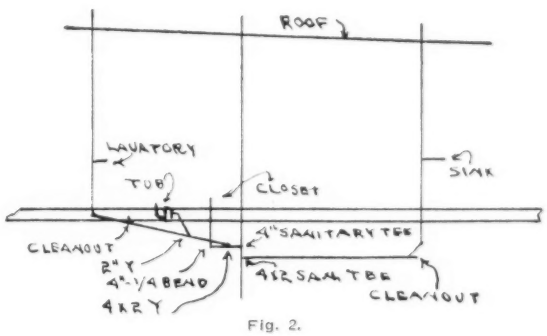


Fig. 2.

Y and the 4 x 2 Y in the bath and lavatory waste, it would throw both fixtures out of commission until the stoppage were removed.

Some sanitarians object to the use of sanitary tees, claiming that better results are obtained by the use of Ys and ⅛ bends, but in this case, we are of the opinion

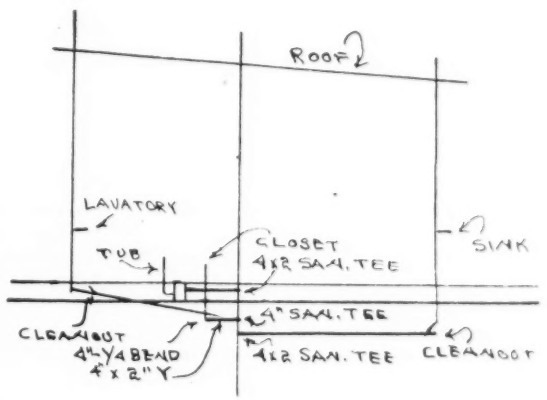
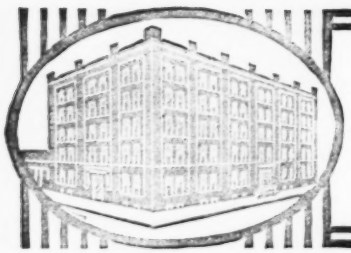


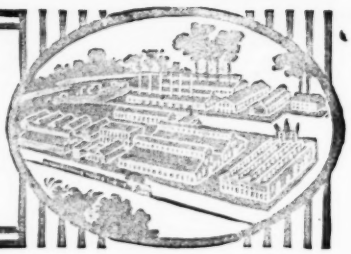
Fig. 3.

that the same results are obtained by the use of sanitary tees as would be obtained by the use of Ys and ⅛ bends.

In Fig. 2 there would be no danger of siphoning the bath trap by a discharge from the lavatory. This may have been one of the points of objection raised against this installation, but as regards the best installation, we would recommend that shown in Fig. 3.



News of Interest Among the Wholesalers and Manufacturers



WILL REPRESENT THE A. S. H. & V. E.

D. D. Kimball, 15 West 38th Street, New York, has been appointed to represent the American Society of Heating and Ventilating Engineers as chairman of the Section on Ventilation of the Department of Industrial Hygiene and Sanitation of the American Museum of Safety, 29 West 39th Street, New York City.

E. DeFOREST WINSLOW ON OUR STAFF AGAIN.

E. DeForest Winslow has accepted the management of "Domestic Engineering's" New York office. Mr. Winslow was formerly connected with "Domestic Engineering" for a period of nine years, and for the last three years has been associated with the Judd-Winslow Co., of Muskegon, Mich. Mr. Winslow enjoys a large acquaintance in the plumbing and heating field, and is welcomed back to "Domestic Engineering's" staff.

AUTOMATIC SPRINKLERS COMPULSORY IN NEW YORK CITY.

A law passed by the New York Legislature requires the use of automatic sprinklers in every factory building in New York City over seven stories or ninety feet in height in which wooden flooring or wooden trimming is used, and where more than 200 people are regularly employed above the height mentioned. This installation has to be made before April 15, 1913. A penalty is provided for failure to comply with this requirement.

GEO. W. CAMPBELL RETIRES FROM THE ROAD.

Geo. W. Campbell has resigned his active duties as traveling representative for the Campbell Mfg. Co., of Gadsden, Ala., but still remains a stockholder and director in that company. It is Mr. Campbell's intention to engage in the manufacture of plumbing specialties, and he contemplates having the new plant in operation about Oct. 1. It has not been fully decided whether the new plant will be located at Gadsden or at Chattanooga, Tenn. Upon retiring from active duties with the Campbell Mfg. Co., Mr. Campbell was presented with a handsome Knights of Pythias watch fob by the employes of the company.

OTTO A. MELTZOW IN CHARGE OF ST. LOUIS OFFICE.

The Consolidated Engineering Co., of Chicago, announces that they have appointed Otto A. Meltzow manager of their St. Louis office. Mr. Meltzow is one of the best known men in the engineering lines in St. Louis, having been for many years chief engineer for the Cupples Station property, one of the largest groups of buildings heated from a central plant in that city. During his connection with these people, Mr. Meltzow was an extensive user and a strong advocate of the Van Auken system and specialties, with the result that this system which he now represents is exclusively installed in that group. With his wide acquaintance, years of experience and strong personality, Mr. Meltzow is bound to be a factor in the heating business in St. Louis.

THE NEW VICE-PRESIDENT AND SECRETARY OF THE CONSOLIDATED ENGINEERING CO.

The accompanying halftone is a good likeness of W. J. Price, who was recently elected vice-president and secretary of the Consolidated Engineering Co., of Chicago,

W. J. Price, the New Vice-President and Secretary of the Consolidated Engineering Co.

as recorded in this column three weeks ago. Mr. Price is now acclimatized to Chicago's summer weather and it is said that he likes it as well as the North Dakota variety.

WESTERN TRADE GOLF ASSOCIATION JULY TOURNAMENT.

Mr. H. E. Keeler was the attentive host of the Western Trade Golf Association at its second field day of the season on Thursday, July 25th, at the Edgewater Country Club, Rogers Park, Ill., when about twenty

devotees of the game participated in the day's sport. Had it not been that few had ever played over these links before, the Colonel would have been hard pressed. The new method of arriving at the handicaps seemed to appeal to all. The Association Cup, a new feature, was exhibited and played for. The results of the day's play were as follows:

Association Cup and Replica, won by John M. McDonald, Dubuque, Iowa.

First Flight Cup, won by H. M. Sedgwick.

Second Flight Cup, won by D. E. McCabe.

Third Flight Cup, won by W. B. Dale.

Fourth Flight Cup, won by L. C. Huckins.

Fifth Flight Cup, won by W. M. Scudder.

Mr. McDonald, of Dubuque, Ia., thus won the first leg on the Association Cup, which becomes the property of any member winning it three times. He received a replica of the cup and will have his name engraved on the Association Cup, which will remain in the possession of the Association to be played for at later tournaments.

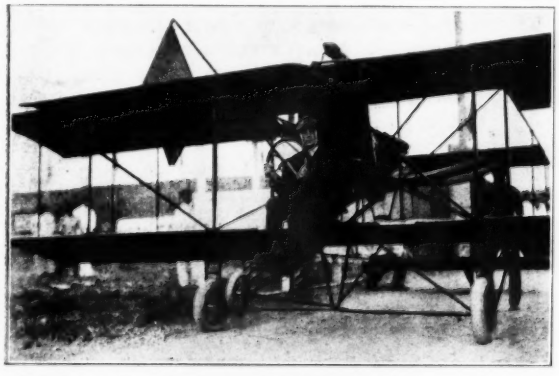
Owing to the absence of the "official" photographer we are unable to present the pictures of the trophies and their winners.

The next meet of the Association will be held during the month of August at the Homewood Country Club.

The officers desire that every man connected with the trade (manufacturer or wholesaler of plumbing, heating and gas supplies) shall become a member of this Association, and participate in its pleasurable and recreative outings. Applications may be made to the secretary, Mr. H. M. Sedgwick, 3617 Shields Avenue, Chicago.

FAMOUS AVIATOR NOW PLUMBING SUPPLY SALESMAN.

Lee Hammond, the well-known aviator, has recently accepted a position with the Federal-Huber Co., of Chicago, as sales representative, in preference to continuing in the field of aviation. After a notable career as a "bird-man" in which Mr. Hammond encountered many thrilling experiences and narrow escapes from death, he has retired from the aviation game and decided to gain his livelihood by safe and sane methods. Even the offer



Aviator Lee Hammond, Now Sales Representative for the Federal-Huber Co., Chicago.—From Photograph Taken at Manila, P. I., in February, 1912.

of half a million dollars to bombard Pekin, was not accepted by him. This large sum was offered by Sun Yat Sen to the airman who would load his biplane with large quantities of explosives, soar above the Chinese capital walls and drop nitro-glycerin, dynamite bombs and gunpowder in spots designated by charts, and destroy the arsenals, homes and quarters of the Manchus. When Mr. Hammond declined the offer, he was asked whether a larger sum than $500,000 would alter his decision, to which he replied in the negative. While his life would have been greatly imperiled if he had consented to carry out the bomb dropping plan of the provisional president of the new Chinese republic, it was not fear nor lack of courage that caused Mr. Hammond to refuse the undertaking.

Probably the most serious accident Mr. Hammond ever had, occurred in Chicago last fall. His engine "went dead" while he was about three and a half miles over Lake Michigan. The only thing for him to do was to come down in the water. He swam for nearly half an hour with a broken ankle until he was picked up in a boat almost exhausted. A dense fog prevented the rescuers from locating him sooner.

Mr. Hammond has not only a splendid mechanical training, but an established reputation as a salesman, before he took up aviation, and he is already meeting with remarkable success in his work of promoting and selling the products of the Federal-Huber Co.

NEW HONEYWELL HEATING LITERATURE.

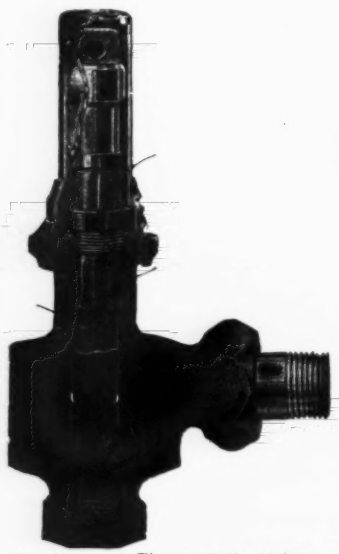
The Honeywell Heating Specialty Co., Wabash, Indiana, has just issued three handsome and instructive booklets entitled: "The Honeywell System of Water Heating," "How to Properly Design and Install

Front Cover Designs of Three New Honeywell Heating Booklets.

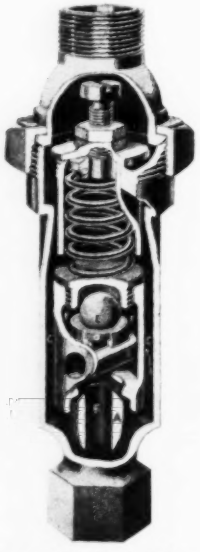
the Honeywell Method of Hot Water Heating, 1912 Edition," and "The Honeywell Temperature Regulator." The first gives a brief history of the formation of the Honeywell Heating Specialty Co., and its almost phenomenal growth, also many well-written articles on the principles of hot water heating, followed by a few illustrations of the many prominent buildings in which they have installed their system of hot water heating. The object of the second named book is to instruct architects, engineers and heating contractors how to properly design and install the Honeywell Method of Hot Water Heating. The work is carefully edited with the idea of placing at their command as varied and complete information and assistance as possible. The third pamphlet illustrates and describes in a comprehensive manner the Honeywell Temperature Regulator. This interesting literature should be in the possession of every heating engineer and master steam-fitter in the country. Copies of these booklets will be mailed free upon application to the above-named company, mentioning "Domestic Engineering."

STEAM SPECIALTIES THAT ARE IN DEMAND.

The National Steam Specialty Co., 8-10 S. Clinton Street, Chicago, has recently secured the entire manufacturing and selling rights of the "B" Heat Intensifier for adding pressure to hot water systems, an illustration of which appears in this column. This company states that this money-saving appliance has already met with an exceedingly gratifying demand in the heating trade. The accompanying illustration also shows the "National" thermostatic valve, which is self-adjusting, operating at any pressure from atmospheric up to 30 lbs. with either live or exhaust steam. It has but two moving parts—the expansion post and the body. The efficiency and lasting qualities of this valve are guaranteed for five years.



The National Thermostatic Valve.



The "B" Heat Intensifier.

In addition to this they manufacture a complete line of automatic air-valves, vacuum valves, Paul valves, drain valves, etc. A very prominent feature of several of their valves is the lock-shield, which prevents unauthorized persons from making adjustments, or tampering with it in any way.

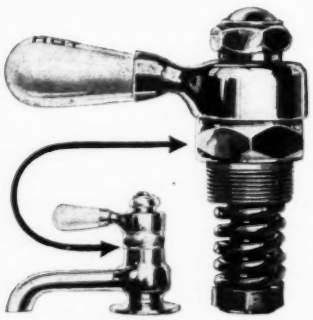
The National Steam Specialty Co. claim to be the originators of the idea of encasing the composition of valves in brass to protect the carbon from bending or buckling out of shape. Steam-fitters and dealers can procure interesting reading matter about these specialties by addressing the National Steam Specialty Co., mentioning "Domestic Engineering."

AN EXAMPLE OF SIMPLICITY IN AUTOMATIC WORK.

Anyone who has had any experience with much the ordinary self-closing work will recall, with mingled emotions, its multitudinous parts and complications. Such work is usually as involved as an eight-day clock. To get at and repair the most simple part is often anything but an easy task.

In contrast to such work is the simple and effective construction characteristic of automatic quick-pression work, manufactured by the Central Brass Mfg. Co., of Cleveland, O. In this work the entire working mechanism is built up about a single stem. The latter is removable by unscrewing the hexagonal head. Even this simple operation is seldom necessary however, since the washer is the only part which is at all liable to wear and its replacement is a matter of but a few moments' time.

The accompanying illustration shows the automatic quick-pression bibb and gives a clear idea of its unique construction. Take note of the heavy, serviceable spring. This seats the washer firmly, yet a child finds no difficulty in turning the handle and holding it open. This



Automatic Quick-Pression Work, Showing How All Working Parts are Removed by Merely Unscrewing the Hexagonal Center.

is owing to the fact that the thrust of this spring is well cared for by the ball-bearing head which also prevents the bibb from shutting with the thud and jar, so common in ordinary self-closing work.

Although automatic quick-pression work represents simplicity and durability, it in no way differs in these particulars from the entire line of quick-pression work. Whether it be a quick-pression bibb, valve or whatnot, the name quick-pression upon it signifies full flow at a quarter-turn, no thumping or pounding and a graceful design combined with an unusually heavy casting, insuring long service-life. In short, quality in design, material and workmanship are the ear-marks of the guaranteed quick-pression work patented.

THE NEU-WA RADIATOR BUSHING.

The Neuman-Warnock Co., of Beaver Dam, Wis., which recently placed the Neu-Wa radiator bushing on the market, reports that this fitting has met a most pleasing reception at the hands of the heating trade and that

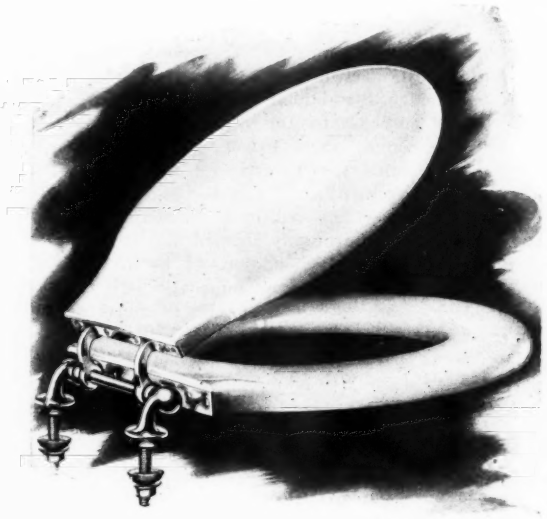
The "Neu-Wa" Radiator Bushing.

the demand for it is constantly increasing. The manufacturers are of the opinion that this radiator bushing is the simplest device for making flow and return connections on one end of a radiator, and that it is a time, labor and money-saver. The bushing is shown

in the accompanying illustration and those interested can obtain full particulars from the manufacturers upon request, mentioning "Domestic Engineering."

THE CELLO SEAT.

In order to meet the growing demand for a white closet seat, the Findeisen & Kopf Mfg. Co., 21st and Rockwell Streets, Chicago, have recently placed on the



The "Cello" Seat.

market their white "Cello" seat, which they report is being very favorably received by the trade. This seat and cover are finished with their special Cello white finish and are guaranteed not to change color. The manufacturers claim that it is not only elegant in appearance but that it is also very strong and durable. The accompanying illustration will give the reader an idea of its attractiveness. Interested parties can secure full details of this attractive seat upon application, mentioning "Domestic Engineering."

AN UNUSUALLY INTERESTING FLUSHING TANK.

The American Valve Co., of Indianapolis, Ind., is meeting with gratifying success in introducing its Style "B"

The American "B" Flushing Tank.

flushing tank to the trade. This tank has nothing inside but water and air stored up to the city pressure. The open supply pipe fills the tank with water, thus forming an air cushion in the top of the tank. Lifting the handle turns up the eccentric until the pressure is so low that the weight of the handle pulls it over, the valve drops back in place and the tank fills ready for another discharge. On account of the air cushion in this tank the entire plumbing in the house is protected against jar by new, quick-acting valves anywhere in the building. Noise and strain are eliminated and breaks often prevented by this cushion absorbing the jar. The manufacturers claim that this tank is noiseless in refilling uses less water and is more prompt in its action than any other kind, and that it saves its price in water bills. This tank will fit any bowl and can be ordered without bowl or seat. The accompanying illustration shows the Style "B" tank and combination complete. Descriptive literature will be mailed to interested parties upon request to the American Valve Co. When writing, kindly mention "Domestic Engineering."

L. H. PRENTICE CO.—"LOOKING BACKWARD."

The L. H. Prentice Co., 330 Sherman street, Chicago, after thirty-five years' experience as engineers and contractors for heating and ventilating apparatus, recently issued a resume of the company in the form of a booklet

Cover Design of L. H. Prentice Co's. New Booklet.

entitled "Looking Backward," the front cover of which is reproduced in miniature in this column. In this booklet are handsome illustrations of many prominent office and public buildings, hotels, apartments, theatres, etc., in which they have installed heating and ventilating systems. The last few pages of the booklet are devoted to testimonial letters from various concerns in regard to the character of service rendered by the L. H. Prentice Co. Any one desiring a copy of this interesting pamphlet can procure same by sending a card to the L. H. Prentice Co., mentioning "Domestic Engineering."

AN INTERESTING GOVERNMENT REPORT ON STEAM BOILERS.

The United States Bureau of Mines makes the statement in a bulletin just issued that the present steaming capacities of steam boilers can be tripled or quadrupled by forcing over the heating surfaces three or four times the weight of gases now passed over them. "With well-designed mechanical-draft apparatus this greater weight of gases can be forced through the boilers at small operating cost," the bulletin states. "It is possible to increase the capacity of many of the present boilers in this way without reducing their efficiency much; in fact by proper arrangement of the heating surfaces the efficiency can be made higher than the present rating. The efficiency of any boiler can be increased by arranging its heating surfaces in series with respect to the path of hot gases. New boilers of high efficiency can be constructed by making the cross section of the gas passages small in comparison with the length."

These statements are contained in Bulletin 18, the Transmission of Heat Into Steam Boilers, the authors being Henry Kreisinger and Walter T. Ray. The investigation of the transmission of heat into steam boilers is one of several researches now being carried on by the Bureau of Mines that have for their object the testing of methods by which the mineral fuels in this country may be used more efficiently. A better understanding of the laws governing heat transmission into boilers will result in the design of more efficient boilers, and more efficient boilers will reduce waste in the use of fuel.

The bulletin contains the following:

"Nearly a hundred years of practical investigation of boiler and furnace problems has resulted in little advance. Perhaps the main reason why many of the investigations failed to bring about progress was that boiler and furnace were considered a unit and were investigated together. Various combinations of boilers and furnaces have been built and tested without thoughtful planning. Many of the published results of such tests confuse the performance of the boiler and the furnace in such a way that it is difficult, if not impossible, to tell which of the two should be blamed or praised for the poor or good results obtained from the combined apparatus. Evidently, many persons have thought that the combined efficiency could be greatly increased by some mysterious manipulation.

"The principles governing the combustion of fuel in boiler furnaces and the absorption of heat by boilers have been little understood. The dogmas that the area of grate should have a certain ratio to the area of the heating surface, and that it takes 10 square feet of heating surface to make one boiler horsepower, seemingly had become so thoroughly fixed in the mind that they were hardly ever questioned. It is only within the last decade that a few engineers have broken away from the old rule of thumb methods and have begun to investigate the functions of the boiler and furnace separately. Their studies seem to mark the beginning of advance in steam-generating apparatus.

"The boiler is the metallic vessel that contains water and steam and absorbs heat; consequently it should be studied as a heat absorber.

"The furnace is that part of the steam-generating apparatus in which the potential energy of the coal is changed into heat; consequently it should be studied as a heat generator."

Copies of this bulletin may be obtained by writing to the Director of the Bureau of Mines, Washington, D. C.

THE METAL MARKET

CONGESTION AT THE STEEL MILLS.

Consumers of finished iron and steel all over the country are urgently requesting that shipments be hurried forward at the earliest possible moment. At the mills every effort is being made to turn out a record-breaking tonnage, and supply consumers, but the order books of the steel companies have more unfilled tonnage on them than a month ago, in spite of this tremendous activity. Southern pig iron markets have again advanced and No. 2 Southern Foundry, Birmingham, is now squarely $12. In the north the purchase by the United States Steel Corporation of a round lot of 10,000 tons of steel-making iron was the signal for a moderate advance in these grades. The makers of coke and the pig iron interests are coming together and within a short time the coke situation should be thoroughly cleaned up. In the line of structural steel work the amount of business on the books of all the fabricators is unusual. Deliveries are being made everywhere in from twelve to fourteen weeks after specifications are received and with the new orders coming in, it is probable that this interval will be lengthened to twenty weeks before September 1. In plates the deliveries are just as unsatisfactory. An advance of $1 per ton was made in wire nails and wire products.

COPPER QUIET BUT STEADY.

European interests have purchased copper only sparingly during the last month, but private letters recently received in New York from those well informed in Berlin are to the effect that Germany as well as all the rest of Europe, must continue to buy copper in large quantity. This holding off that has been noticed for a month is partially the result of the unfavorable political situation in Great Britain, but actual purchasers cannot be delayed much longer. In the United States the consumption of copper today is larger than ever before. It is not only used in a greater variety of ways, but in the electrical industry, where the greatest proportion of tonnage is used, there is more of it being used than ever before. The General Electric Co., the leading consumer of copper in electric prime movers and other producing machinery, is building new factories and "cutting melons" to keep down the profits. Other companies engaged in similar lines of work are having more business than ever before. Prices show practically no change and electrolytic is quoted at 17.62½ cents.

THE OLD METAL MARKET.

Dealers' buying prices in New York are:

Light copper	$13.00 to	$13.25
Strictly crucible copper	14.75 to	15.25
Uncrucibled hy. copper	14.25 to	14.50
Uncrucibled copper wire	14.25 to	14.50
No. 1 brass turnings	8.00 to	8.25
No. 1 composition turnings	10.50 to	10.75
Cocks and faucets	9.50 to	9.75
Light brass	7.25 to	7.75
Heavy brass	8.50 to	9.00
Heavy lead	4.10 to	4.15
Tea lead	3.75 to	3.85
Close cut solder joints	8.00 to	8.25
Block tin pipe	39.50 to	40.00

GOVERNMENT CONTRACTS TO BE AWARDED.

Acting Supervising Architect James A. Wetmore, Treasury Department, Washington, D. C., will receive sealed proposals as follows:

Until 3 p. m., on August 26, 1912, for the construction, complete (including plumbing, gas piping, heating apparatus, electric conduits and wiring, interior lighting fixtures, and approaches) of the United States post office at Punxsutawney, Pa. The building is of one story with a mezzanine at each end and basement at one end only, and has a ground area of approximately 5,200 square feet. First floor only fireproof; stone and brick facing, and slag roof.

Until 3 p. m., on August 21, 1912, for the construction complete (including plumbing, gas piping, heating apparatus, electric conduits and wiring, interior lighting fixtures, and approaches), of the United States post office at Frostburg, Md. The building has a ground area of approximately 3,100 square feet. The construction is nonfireproof throughout. The exterior face of the building is of granite and brick, with stone trimmings and cornice; roof is of tin with copper gutter.

Until 3 p. m., on August 16, 1912, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring, and interior lighting fixtures), of the United States post office at Franklin, La. The building is two stories, without a basement. It has a ground area of approximately 3,950 square feet; nonfireproof construction: stone and stucco facing; wood cornice and composition roof.

Until 3 p. m., on Auugst 30, 1912, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring, and interior lighting fixtures), of the United States post office at North Tonawanda, N. Y. The building to be two stories and basement, of approximately 5,730 square feet ground area, brick faced, with stone trimming and slate roof.

Until 3 p. m., on August 27, 1912, for the construction (including plumbing, heating apparatus, gas piping, electric conduits and wiring, and lighting fixtures), of a two story and basement building of approximately 6,560 square feet ground area; stucco faced with stone and terra cotta trimming, for the United States post office at Santa Barbara, California.

Until 3 p. m., on September 5, 1912, for the construction (including plumbing, gas piping, heating apparatus, electric conduits and wiring, interior lighting fixtures and approaches), of the United States post office at Rapid City, S. Dakota. The building is two stories and basement and has a ground area of approximately 5,100 square feet; fireproof construction except the roof, granite and limestone facing, and tin roof.

Until 3 p. m., on September 6, 1912, for the extension, remodeling, etc. (including plumbing, gas piping, heating apparatus, electric conduits and wiring, lighting fixtures and approaches), of the United States post office and Court house at Guthrie, Oklahoma. The extension will be four stories and basement with a ground area of about 4,800 square feet; fireproof construction except ceiling and roof; brick faced with stone and terra cotta trimming; slate roof.

Until 3 p. m., on August 29, 1912, for the extension, remodeling, etc. (including plumbing, gas piping, heating apparatus, electric conduits and wiring, interior lighting fixtures, and approaches), of the United States post office and Custom house at Traverse City, Mich. The work contemplated is the construction of a one-story, basement and attic extension of approximately 1,900 square feet ground area; fireproof construction, stone and brick facing and tin roof; and certain remodeling and repairing of the present building.

All proposals should be in accordance with drawings and specifications, copies of which may be obtained from the custodians of the above sites, or from the Acting Supervising Architect at Washington, D. C.

AN UP-TO-DATE PLUMBING ESTABLISHMENT IN NORTH DAKOTA.

The accompanying illustration shows a corner of the modern plumbing and heating establishment of Grambs & Peet Co., at Bismarck, N. D. This concern was formerly known as the Dickens Plumbing & Heating Co., and moved into its new and spacious building about two years ago. During their business career this company

A Corner in Grambs & Peet Co's. Up-to-date Establishment at Bismark, N. D. The Gentleman in the Picture is Mr. Peet.

had made a great many large plumbing and gas-fitting installations, some of their notable contracts being: Heating, plumbing and gas-fitting in the new United States post office and in the new addition to the Grand Pacific hotel of Bismarck; heating, plumbing and gas-fitting in the Northern Pacific hospital at Glendive, Mont.; heating, plumbing and ventilating the new dormitory at Standing Rock; the street lighting system at Jamestown, N. D.; heating and ventilating the school buildings at Dawson and Flasher, N. D.; plumbing and heating system in school building and in the Gordon hotel, at Glendive, Mont.; heating and plumbing in the Hughes building, and heating systems in twenty-five new residences at Bismarck.

One Better.

Englishman—"You Americans like nothing better than a nine days' wonder."

American—"Oh, yes we do."

Englishman—"What?"

American—"A nine inning wonder, for instance."—Puck.

The Phrase Illustrated.

Ragged Rogers—Hear about Dusty? He picked up a quarter, got roarin' drunk an' the judge sent him up for ninety days.

Frayed Philip—Gee! Dat's what you might call trouble from an unexpected quarter.—Boston Tran-cript.

News of the Plumbing and Heating Contractors

Reports of the Week from Many Different Cities Show Both Business and Personal Activity in the Trade

NEWS FROM THE PACIFIC COAST.

San Francisco.

While there have been no particular developments in business conditions on the Coast in the past week, yet the feeling this week in San Francisco, at least, is more cheerful. Weather conditions are splendid for all kinds of building work and there is very little labor trouble to retard construction projects. New large jobs are rather scarce, but the way plans are being materialized for small buildings, is most encouraging. The season will undoubtedly turn out to be very satisfactory as to volume of business.

Plumbing and heating firms are naturally kept fairly busy the greater part of the year in California, and this season is as good, if not a little better for them than last year, but with the ventilating firms, vacuum cleaning concerns, as well as firms who make a specialty of installing automatic sprinkler systems, business is much better than the average. This does not mean that such firms are unusually prosperous, however. The fact is, competition among such firms is very keen and the figuring so close that it is doubtful if legitimate profits are always possible. A number of firms handle all kinds of domestic engineering work, yet by far the larger part are specialists who confine their activities to one main line. No doubt consolidation would be an advantage in many cases, still there is but little tendency toward consolidation in these allied trades at present. As long as separate bids are called for on the larger jobs, the specialist has a good chance to build up an independent enterprise. Practically all San Francisco sub-contractors are favorable to the separate contract system which is largely in vogue on the Coast.

B. S. Foss, secretary of the B. F. Sturtevant Co., of Boston, Mass., has just been on a visit to the Coast offices of the company investigating general business conditions. While in San Francisco, Mr. Foss expressed himself as being well satisfied with the business outlook in this vicinity and in the northwest, especially around Portland, Ore.

The low bidder for the steam heating work on the State Hospital at Stockton, Cal., is F. P. Walsh, of San Francisco. His bid is $11,887. Contract not yet awarded.

The contract for installing an automatic sprinkler system in the new theater building of the Boston & San Francisco Amusement Co., at Market and Seventh streets, has been awarded to the Mechanical Installation Co. Amount of contract $1,900. Waterhouse & Price were awarded the contract for installing a vacuum cleaning system in the same building.

Bids on different jobs for the Sacramento Armory at Sacramento, Cal., have been opened and the McGivray Construction Co., are the low bidders on the plumbing and gasfitting work, $4,600, and on the steam heating, $2,500. Contracts not yet closed.

The General Engineering Co. has been awarded the contract for installing a steam heating system in the remodeled and enlarged building at Sixteenth street and Julian avenue, C. F. Lewis and W. H. Hyde, jr., trustees. Amount of contract, $1,693. The plumbing, drainage and gasfitting contract on the same building went to A. Davies. Amount $4,728.

Sealed bids will be received by the Depot Quartermaster, U. S. Marine Corps, 182 Second street, San Francisco, Cal., up to August 11, 1912, for the construction at the Marine Barracks at the Mare Island Navy Yard, Vallejo, Cal., of one complete hot water heating system, including the furnishing of machinery.

The Portland Central Heating Co. has been organized in Portland, Ore., by John H. Hall, L. H. Tarploy and W. O. Van Schuyver. The plan of this concern is to furnish a hot water circulation for two hundred homes in Westover Terraces, Portland. The Pacific Heating Engineering Co. of Salem, Ore., has been awarded the contract for installing the plant and system.

NEWS FROM WISCONSIN.

Waupaca.—The Central Wisconsin Master Plumbers' Social Benevolent and Sanitary club held its district meeting at Waupaca July 16. The large number of master plumbers, their families and employes, which attended this meeting, were shown a splendid time by the Waupaca brothers. After a short business meeting, an outing was held at one of the beautiful lakes near Waupaca for which special invitations had been sent to the members to bring their families and employes along to enjoy the hospitality of the Waupaca master plumbers.

Racine.—The Thomas Heating Co., has closed a contract with the county for installing the heating and ventilation systems in the proposed new county court house at a cost of $10,943. The plumbing contract for the same building was awarded the Charles Wilkenson Co., Minneapolis, at $5,476.

Eau Claire.—The board of public works is contemplating repairs on the central heating system in the city building. The old boilers will be replaced by two new boilers by P. L. McQuillan, of this city, for the sum of $2,995.

Mazomanie.—The school board of this place will have a steam heating plant installed in the school building. Bids for the same have been called for by the clerk of the board.

West Milwaukee.—S. J. Brew, village clerk, has advertised for bids for furnishing and laying water mains, hydrants, etc. The water pipe will be six-inch cast iron, of which about 1,314 lineal feet will be required.

Waukesha.—The plumbing store of Brewer & Jones is now located in the west portion of the new Farmers State Bank building, on South street. The new store has been attractively arranged, the office and sales room being on the first floor, with the shop and ware rooms in the basement.

Madison.—The work on the septic tank of the new $180,000 sewage disposal plant, which is to be constructed in this city, has been started by the contractor, John T. Blake. The tank is to be constructed on property now owned by the city, in the town of Burke. It will contain five compartments, and be built principally of concrete. A force main will be run from the present sewage plant to the new site, which will involve an expenditure of $50,000. The contract for this work has not yet been awarded. A sewer 407 feet long, will be constructed as the extension of the intercepting sewer from its present terminus to the new pumping station. City Engineer E. E. Parker has estimated the cost of this improvement at $8,000.

Milwaukee.—Improvements in the heating system of the city hall will be made soon. Bids for the work have been closed by the department of public works. It is estimated that the cost of the new boilers will amount to from $8,000 to $10,000.

Des Moines, Ia.—Trade conditions of the plumbing business throughout the State of Iowa are very favorable. Considerable new work is being done and the up-to-date and progressive plumbers are enjoying the benefits of this construction work.

Philadelphia.—The new bath house at Tacony is completed and ready to be turned over to the authorities, but it cannot be used for a year, because in the construction of the building somebody forgot to make provision for a water supply. This little detail apparently did not enter into the preparatory plans for the construction of the bathhouse, or into the specifications governing its construction. It was not until the building was almost complete that it was discovered that the needed connections had been overlooked.

NEWS FROM OHIO.

Columbus.—Architects Stribling & Lun, of this city, will soon be ready for bids for the heating and plumbing systems in the Masonic Temple addition on North Fourth Street.

Lima.—The contract for the new heating plant to be installed in the new Reese Avenue school building was awarded to the American Warming and Ventilating Co., of Cleveland, for $5,800.

Tiffin.—Contracts for furnishing heating and ventilating plant for the New College Hill school house has been awarded to the Columbus Heating and Ventilating Co., of Columbus, for $3,890. This was the highest bid, there being three others. V. M. Gattius, of Toledo, $3,345; Wm. T. Chafin, of Toledo, $3,345; and the Peck-Hammond Co., of Cincinnati, $3,750. The inducements offered by the Columbus Heating & Ventilating Co. are believed by the board to make it the best bid.

Columbus.—Plumbers in this city and central Ohio are looking forward to considerable work when the remodeling of the Virginia and the Norwich hotels is started. The management of both hotels announce that extensive remodeling will be done which will mean the installation of a large number of baths. The city council has adopted an ordinance providing for the building of three comfort stations in Columbus to be ready for the visitors at the Ohio-Centennial celebration to take place late in August. A permanent station will be erected at the corner of Naghten and High streets.

Canal Winchester.—The board of education of this city will receive bids August 22, for a thorough remodeling of the heating apparatus of the city school building.

Akron, O.—This city secured the consent of the State Board of Health to install a Hopcroft-Matlack process for sewage and garbage disposal after plans and specifications by C. D. Crouch. The entire process will not be formally endorsed until after it has been thoroughly tested.

NEWS FROM PHILADELPHIA AND VICINITY.

George Weer, 114 Queen Lane, Germantown, Philadelphia, will install plumbing in seven new houses, 3601 to 13 Colemet Street, for E. W. Bryan.

J. B. Shotts, 22d and Wharton Streets, Philadelphia, will make sewer connections and alterations at 2019 Oakford Street for J. McKay, owner. He also has contract for the plumbing at 2010-14-20 Latona Street, Philadelphia, for A. Lawrence.

C. E. Monday & Co., 1318 Olive Street, Philadelphia, will install the plumbing in the Recreation Park, 26th and Jefferson Streets, for the city of Philadelphia.

Dennis Faby, 2407 E. Somerset Street, Philadelphia, will make additions and alterations to the plumbing system at 2638 Almond Street, Philadelphia, for J. Jameson.

D. J. Potter, 3232 Frankford Avenue, Philadelphia, has the contract for plumbing in four new houses at Emerald and Cambria Streets, Philadelphia, and four new houses at Jasper and Cambria Streets, for E. A. Duff.

Fred Speth, 3531 N. 5th Street, Philadelphia, in addition to other contracts, will install plumbing in 29 new houses at Darien and Pike Streets, Philadelphia, for H. Brockelhurst.

Robert G. Weir, 237 W. Girard Avenue, Philadelphia, will introduce drainage systems in eight houses for Mrs. E. A. Stapleford at 302 to 16 E. Cambria Street, Philadelphia.

Robert Williams, 6015 Chestnut Street. Philadelphia, has the contract for plumbing three new houses, 20-24 S. 50th Street, Philadelphia, for Theo. A. Brown.

W. E. Lamond, 603 S. 22d Street, Philadelphia, will make additions and sewer connections at 2118-20 Kater Street, Philadelphia, for S. Kates.

Robert P. Gailey, 1521 W. Venango Street, Philadelphia, will install the heating system at 3531 Gratz Street for Jas. Gambler. He also has the contract to heat David Gaiklers' residence, 3525 N. 16th Street, Philadelphia.

Mullin & Nolan, 728 Oxford Street, Philadelphia, will introduce drainage systems at 2825-27-29 and 43 N. 11th Street, Philadelphia.

Hicks Bros., 651 N. 8th Street, Philadelphia will make additions to the plumbing system at 138-44 Pegg Street, Philadelphia, for Philadelphia & Reading Ry. Co.

M. J. Foley, 1533 Porter Street, Philadelphia, will install plumbing in two new houses, west side of Erwing and 78th Streets, for E. G. Burrell.

Benj. H. Knowles, 108 E. Wingohocking Street, will install the plumbing in four new houses at 13th and Ontario Streets, Philadelphia.

H. C. Williams, 803 E. Ontario Street, Philadelphia, has the contract for plumbing in two new houses at Kensington Avenue and Atlantic Street, for T. J. Buckley.

NEWS FROM NEW ENGLAND.

New Hampshire.

Salem.—James R. Tetler, of Methuen, Mass., has been awarded the contract for plumbing and heating in a new house to be erected for W. D. Pulver, on Pleasant Street.

Newport.—The contract for heating and ventilating and work about the power house for the new shoe factory being erected by the W. H. McElwain Company at Claremont, has been awarded to F. E. Newcomb, of this place. The contract was secured in competition with several of the largest steam-fitting firms in New England.

Dover.—P. J. Henderson, of Worcester, has been awarded the contract for repairing and improving the heating systems in the schoolhouses of the city. A crew is expected to arrive and commence work soon.

Dover.—Plumber J. Henderson of Worcester, Mass., has been awarded the contract for changes and repairs to the boilers and heating systems of the several school buildings of Dover. Extensive changes will be made in several instances.

Rhode Island.

Cranston.—The city council has appropriated $1,500 to cover the expense of installing new plumbing in the Doric Avenue school. The contract has not yet been placed.

Woonsocket.—William D. Grady, chief plumber at the works of the Woonsocket Rubber Co., has been named as acting inspector of plumbing to serve until the city council meets and names a permanent inspector next month. The vacancy is due to the resignation of Inspector Frank P. O'Donnell, who left the city's employ to enter business for himself. He was the only inspector of plumbing that the city ever had, having served continuously from the time the office was created. The position pays $1,100 a year.

Massachusetts.

Lynn.—J. P. Morgan & Sons, the lowest of the two bidders, has been awarded the contract for plumbing, heating and ventilating the new Hollingsworth street fire station at a contract price of $2,147. The only other bidder was M. A. Dame & Sons Corp., whose figure was $2,160.

Plymouth.—The selectmen have awarded the contract for installing a steam heating plant in the town house to M. D. Welsh. There were a number of bidders of which Welsh was the lowest.

Springfield.—The C. A. Albee Co. has been awarded the contract for installing an indirect radiation system in the Buckingham school building. Their bid of $1,127 was the lowest of three received, the other bidders being the Wyckoff & Lloyd Co., and Morrissey Brothers. New boilers have already been installed in the building.

Boston.—Mayor Fitzgerald has given his official approval to a contract with the F. W. Zemier Co. for changes in the heating system at the Roger Clapp schoolhouse, the contract price being $1,546. Other bidders were: Laskey & McMurrer, $1,591; J. Hurley & Co., $1,650; James P. Dwyer Co., $1,679; McLean & Cousens, $1,881; Hern Furlong Co., $1,672; Huey Bros. Co., $2,127. The mayor has also sanctioned a contract with Laskey & McMurrer for changes in the heating system of the Bigelow school building for $1,894. The other bidders for this work were: J. J. Hurley & Co., $1,945; James P. Dwyer Co., $2,109; Huey Bros. Co., $2,407; Hern Furlong Co., $2,148; McLean & Cousens, $2,279; F. W. Zemier Co., $1,964.

Lee.—W. B. Bull, of Lenox, is installing a steam-heating plant in the Phelan block. He recently completed the installation of the plumbing in the same structure.

Connecticut.

Bridgeport.—The contract for the plumbing for the new residence of Robert N. Sperry has been placed with R. T. Rock. C. S. Eames & Co. has the contract for plumbing and heating in a new residence for Judge Henry A. Stevenson, which is now in process of construction. Plumbing and furnace heating in a two-family house, which is being erected for John Koestner, will be done by A. E. Roberts.

New Haven.—S. Lyman & Co. has the contract for the plumbing in a six-family house on Day Street for Alberts, Samson and Komiser. James C. Brown will install the plumbing and heating system in a new house on Derby Avenue, Orange, for Mrs. Dora R. Schillinglaw. Clerkin & Co. have contracts for plumbing and heating a new house on Lombard Street for J. F. Brady. The house is to be arranged for two families

New Britain.—C. H. Wilson has resigned as instructor in plumbing in the state trade school in this city

Maine.

Augusta.—A certificate of incorporation has been filed with the secretary of state by the Universal Ventilating Co., of Augusta. The promoters are D. S. Delaney, Kansas City; L. J. Coleman and R. S. Buzzell, Augusta.

CONTRACTS AWARDED.

Ogden, Utah.—Contract for the plumbing in the Mound Ford school building has been awarded by the board of education to the Halverson Bros. Co., of this city, at a figure of $1,413.

Birmingham, Ala.—The Home Plumbing Co. of this city has been awarded the contract for the plumbing in the twenty houses now being erected by the Ensley Land Co.

Dallas, Tex.—The school board has awarded the contract for the plumbing of the Rusk, Milan and Brown schools, to the H. B. Niblo Co. of this city, the total bid being $8,973. Two other bids were received.

Chassell, Mich.—The bid of E. A. Hamilton for the plumbing of the new Chassell school has been accepted by the school board, and the work will begin immediately.

Harrisburg, Pa.—Contract for plumbing and alterations in the Senate cloak room at the Capitol, has been awarded to C. F. Crabbe of this city.

Stockton, Cal.—Contract for the heating system at the Washington school has been awarded to Edward L. Gnekow of this city for $2,220.

Dickenson, N. D.—Contract for the heating, plumbing and ventilating of the Elk home has been awarded to Grambs & Peet. The price is a little less than $7,000.

Fort Wayne, Ind.—Contracts for installing heating and ventilating apparatus in two school buildings in Fort Wayne, have been awarded to the Lige Heating and Ventilating Co., of this city.

Ogden, Utah.—The Western Heating and Ventilating Co., of this city, has secured contracts for the installation of the heating and ventilating equipment in the new school at Corinne, Utah.

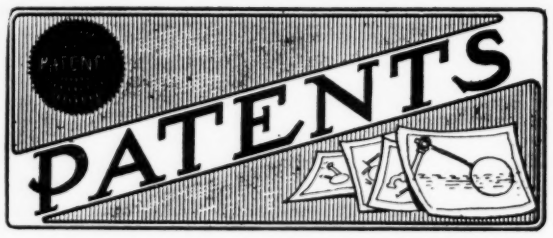
Palestine, Tex.—Contract for heating and ventilating the public school buildings of this city has been awarded to the Moncrief Furnace and Manufacturing Co. at a figure of $4,100.

Grand Rapids, Mich.—Sproul & McGurrin have been awarded the contract for heating the St. Mary's Catholic church at Lansing, Mich.

Danville, Ill.—Arthur Murray, of Hoopeston, Ill., secured the contract for the new heating plant in the Philo school of this city. His bid was $1,400, being the lowest of six bidders.

Muncie, Ind.—Contract to install the plumbing in the city school building of Sullivan, Ind., has been awarded to Earl Clevenger, of this city. The price is $7,380.

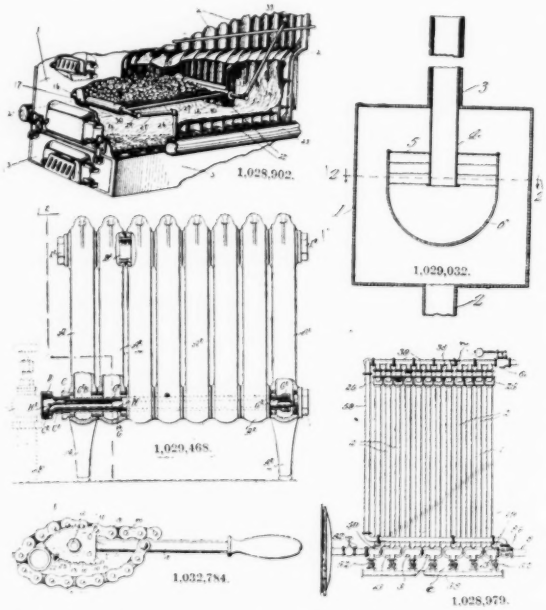
Hibbing, Minn.—The A. C. Schirmer Co., of this city, has been awarded the contract for installing the plumbing in six new residences being built by the Inland Steel Co., Co., at Crosby, Minn., on the Cuyuna range.



Heating Department.

1,028,902. Boiler-Grate. John L. Newton, Utica, N. Y., assignor to Hart & Crouse Co., Utica, N. Y., a corporation. In a hot-water heater formed with an internal fire space, a grate formed in two independent sections, each of a plurality of pipes with a header at each end and a pipe extending from each header outwardly through the wall of the heater and connected with the circulating system outside the walls of the heater, substantially as described.

1,029,032. Accelerator for Hot-Water Heating Systems. Adolf G. Stapel, Montgomery, Ala. An accelerator comprising a tank having an inlet in its lower portion, an outlet conduit communicating with said tank below its top and arranged in substantial alinement with said inlet, and a concave baffle interposed between said inlet and said outlet, and having its upper edge above the lower end of said outlet conduit.



1,029,468. Radiator. Frederick Schneider, Fort Leavenworth, Kans., assignor of one-fourth to Samuel F. McDonald, Memphis, Tenn., and one-fourth to George F. Weller, Leavenworth, Kans. A radiator, comprising a series of connected radiator sections, a supply valve, a distributing pipe connected with the said supply valve and extending through the radiator sections, except the last one in which the pipe terminates, the said distributing pipe having in its top openings leading into the radiators sections, and a return flow pipe extending through the said distributing pipe and having one end opening into the last radiator section and having the other end terminating adjacent the said valve and water sealed, the space between the said pipes being closed at the outer end.

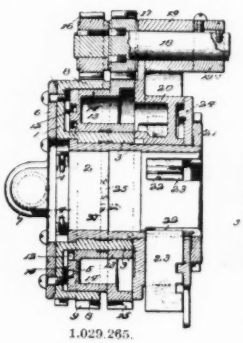
1,032,784. Pipe Wrench and Cutter. Mathew B. Sheridan, York, Pa. The combination in a wrench, of a handle, plates pivotally secured to the opposite sides of said handle, said plates being gradually tapered toward their forward ends, notches formed in the opposite side edges and major ends of the plates, a bridge pin connecting said plates, a pipe cutting tool located between said plates, a

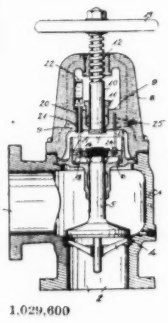
chain attached to the handle, said chain comprising a plurality of links of a width to pass between said plates, pins connecting said links and projecting beyond the opposite sides thereof for engagement with the notches formed in the sides and ends of the plates, when the links are passed between said plates and means for retaining said plate upon said handle.

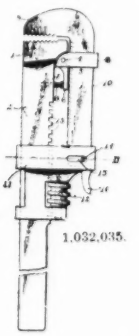
1,028,979. Heater for Water. Robert Wadham, Stockholm, Sweden. In heaters for liquids, the combination of heating sections adapted for the circulation of liquid from a source of supply and provided with an outlet for the discharge of such liquid to a boiler or the like, a source of liquid under pressure independent of the boiler including a normally closed conduit, means adjacent to the lower ends of the sections for blowing off the same and means for connecting said conduit with the sections to supply liquid under pressure to said sections for blowing off the same.

1,029,265. Pipe-Cutting Tool. Bradford Borden, Toronto, Ontario, Canada, assignor to The Borden Co., Warren, O., a corporation of Ohio.—A pipe cutting tool comprising a rotatable carrier, a series of inwardly movable pipe cutters mounted in such carrier, a cam plate engaging each of the cutters for simultaneously moving them inwardly, said carrier and cam plate having differential gear wheels, and differential pinions meshing with said gear wheel, said pinions being actuated by the rotation of the carrier.

1,029,600. Indicator for Stop-Valves. John M. Foster, New York, N. Y. The combination with a stop valve having a body portion providing an inlet and outlet with a valve seat between, a clapper for said seat, a dash-pot piston on said clapper, a dash-pot for said piston, and a yoke closing the top of the valve body, of an indicator rod projecting from said dash-pot piston through the top closure of the valve body, outside the same and adapted to move longitudinally with said piston, and a packing for said indicator rod to prevent leakage.


1,029,265.

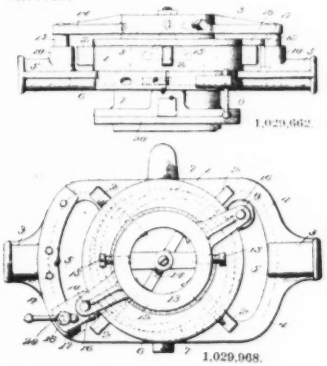

1,029,600


1,032,035.

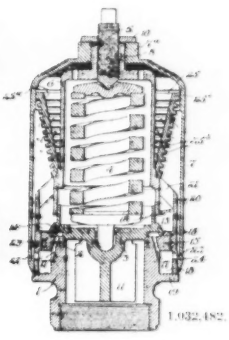
1,032,035. Pipe-Wrench. Alvin E. Ver Beck, Detroit, Mich. A pipe wrench comprising a fixed jaw, a tang extending therefrom, a guide book tiltable on the tang, a spring normally projecting the guide block, a yoke longitudinally reciprocable on the tang, a thumb screw rotatable on the yoke in engagement with rack teeth on the tang, a movable jaw and a shank therefor longitudinally movable through and tiltable with the guide block, the outer end portion of the shank playing in the yoke and moving therewith longitudinally of the tang.

1,029,662. Pipe-Threading Tool. Bradford Borden, Toronto, Ontario, Canada. In combination with a rotatable and longitudinally-movable chaser carrier, a series of radially-arranged chasers, and a cam plate rotatable with and independently of said chaser carrier for engaging the chasers, a post engaging said cam plate to control its axial turning independently of its rotation with the chaser carrier, said post being rotatable with said chaser carrier but not partaking of its longitudinal movement, a member carrying said post, said member having handle sockets, and means for detachably locking said member to the chaser carrier.

1,029,968. Pipe-Threading Tool. Bradford Borden, Toronto, Ontario, Canada. In a pipe threading tool, the combination with a rotatable and longitudinally movable chaser-carrier, a series of radially arranged chasers, and a chaser engaging plate rotatable with, and movable relatively to, the chaser-carrier, of a post engaging with said plate for controlling the relative movement thereof independently of its rotation with the chaser-carrier, said post being rotatable with said chaser-carrier but not partaking of its longitudinal movement, means for causing said post to revolve with the chaser-carrier, and means for detachably connecting the last mentioned means to the chaser-carrier.


1,029,662.

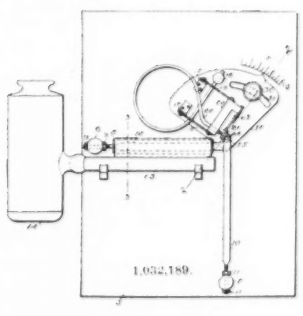
1,029,968.


1,032,482.

1,032,482. Safety-Valve. William E. Jerauld, Boston, Mass., assignor to American Steam Gauge & Valve Manufacturing Co., Boston, Mass., a corporation of New Jersey. In a safety valve, the combination with a base having a passage and a valve seat, a valve proper co-operating with said seat and having a peripheral lip recessed to form a huddling chamber outside of the valve seat, provisions for conducting steam from the huddling chamber, said provisions including an external orifice, and external means movable transversely of said orifice for wholly or partially closing the latter to an exactly regulated extent.

1,032,189. Thermostatic Regulating Device. Edward W. Comfort, Chicago, Ill., assignor to American Moistening Co., Boston, Mass., a corporation of Maine. A thermostatic regulating apparatus comprising a device for controlling a source of energy, and a pair of thermostatic elements operating independently on said device, such elements having a different degree of action on said device caused by their different angular relations thereto.

1,032,787. Steam-Trap. Harold Douglas Singer and Howard Van Doren Pratt, Hospital, Ill. In a steam-trap, the combination of a main steam-tight chamber having a base provided with inlet and outlet openings, a boss on the base having a small chamber, communicating through a series of perforations with the main chamber, and having a tapering passage extending from said small chamber to said outlet-opening, a hollow externally-threaded plug working through a threaded opening in the boss and extending across said small chamber and having a tapering end-portion fitting said tapering passage, the plug having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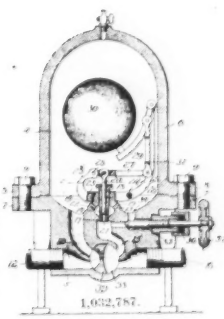
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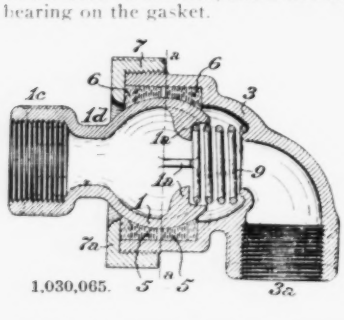
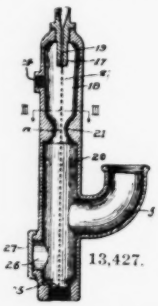
a port communicating with said outlet and also having an annular series of perforations affording communication between said small chamber and said port, a needle-valve in the plug governing said port, a float in the main chamber, and lever mechanism connecting said valve with the float, all constructed and arranged to operate substantially as set forth.

1,030,065. Pipe-Joint. Albert G. Elvin, Somerville, N. J. In a pipe joint, the combination of a ball member having a plurality of radially extending ribs on the inner side of

its wall, a socket member free of said ball member and having a recess, each of said members being fitted for connection to a section of pipe, a gasket fitting between the recess in the socket and the periphery of the ball, a coil spring abutting, at one end, on the wall of the socket, and, at the other, on the ribs of the ball substantially adjacent to the shell of the ball, and a nut engaging the socket and bearing on the gasket.





13,427. Vacuum Cleaning Apparatus. George W. MacKenzie, Ben Avon, Pa., assignor to The Hydraulic Vacuum Cleaning Co., Pittsburgh, Pa., a corporation of Delaware. An aspirating pump consisting of a cylindrical hollow chamber provided with an annular restriction, a fluid inlet jet at one end of said chamber having a reduced aperture, a waste connection at the other end of the chamber beyond the said restriction, and a lateral air suction connection between the waste connection and said restriction, substantially as set forth.

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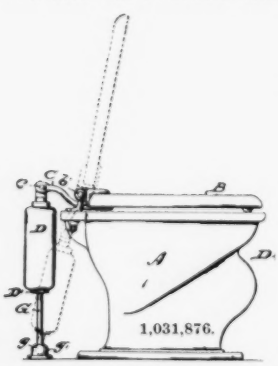
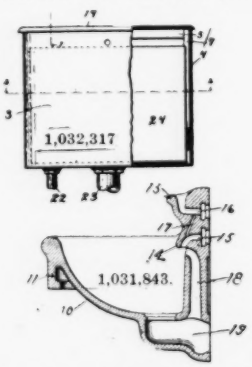
1,031,876. Water-Closet. Frederick A. Schossow, Detroit, Mich. In a device of the character described, a closet bowl, a hinged seat, an annular weight suspended from the seat for elevating the latter, a reciprocating plunger housed within the weight having a rod projecting beyond the end of the weight adapted for flexible connection with an engaging member, said plunger also provided with an air passage opening into the annular weight on opposite sides of the plunger, and means for regulating the passage of air through the plunger.

1,032,317. Flushing-Tank. Carl H. Zwermann, Kalamazoo, Mich. A tank casing, comprising front, side, bottom and top walls, said side, bottom and top walls having inturned flange-like portions at their rear edges to form a flange about the open rear side of the tank, the said parts being formed of an integral blank of sheet metal, said blank comprising a rectangular central portion constituting said front, side walls and the said flange portions on side walls, and oppositely-arranged portions at each side of the said central portion constituting the said bottom, top walls and the said flange portions thereon, the ends of said top and bottom wall portions being curved inwardly to the folding line, their outer corners being notched to receive the said



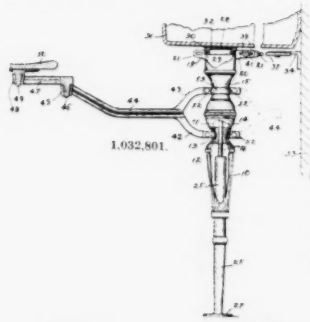


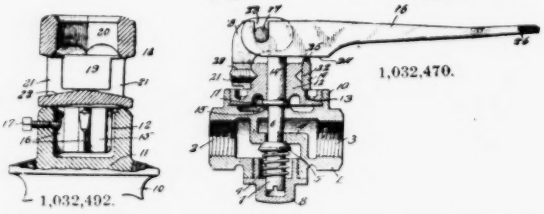
flange portions of the end walls, the meeting edges of said wall and flange portions being welded together.

1,031,843. Combined Lavatory and Sanitary Drinking-Cup. John H. Gavin, Chicago, Ill., assignor to L. Wolff Manufacturing Co., Chicago, Ill., a corporation of Illinois. In a device of the class described, in combination, a lavatory basin and a sanitary fountain drinking cup, said lavatory basin and drinking cup being integrally formed and the cup having a recessed or bell shaped mouth and located above the basin.

1,032,801. Adjustable Support. James Allingham, Chicago, Ill. The combination with an upright support provided at its upper portion with a horizontally projected extension provided with a laterally and longitudinally disposed slot, of a suitably supported horizontal bracket having a vertical projection on one of its surfaces, an arm adjustably secured to said bracket near one of its ends and having a horizontally disposed longitudinal slot to receive said projection, and laterally disposed means near its other end to fit in and engage the slot of the said extension.

1,032,646. Water-Heater. Adolf Beler, Pittsburgh, Pa., assignor to Beler Water Heater Co., Pittsburgh, Pa. The combination with a heater, having a gas supplied burner, a valve to control the supply of gas thereto, and a thermostat located exteriorly of the heater and operably connected to control the gas supply valve; of a water coil located in the heater above the burner, said coil having its upper end communicating with the upper end of said thermostat at the level of the upper end portion of the coil within the heater and its lower end communicating with said thermostat at a lower level, an inlet coil leading from the top of the heater and connected with the first mentioned coil at a point between the levels of the upper and lower end thereof, and a water draw-off connected to the thermostat.





1,032,492. Socket-Head for Curb-Cocks. Philip Mueller, Decatur, Ill., assignor to H. Mueller Manufacturing Co., Decatur, Ill., a corporation of Illinois. A device of the character described comprising a socket head having a cylindrical chamber therein and a polygonal passageway connecting said chamber to the upper end of the socket to receive a turning member, said passageway increasing in width from above downwardly and of less cross-sectional area at any part thereof than said chamber, said chamber having a plurality of passages opening outwardly therefrom in lateral directions, increasing in size, as they progress, the floor of said chamber inclining from the center thereof toward each lateral opening and being continuous with the lower side of the opening.

1,032,470. Fluid-Pressure Valve. Francis S. Denneen and John Rowland Brown, Mansfield, O., assignors to The Ohio Brass Co., Mansfield, O., a corporation of New Jersey. The combination of a valve housing provided with a valve chamber and a diaphragm containing chamber, a valve and valve stem movably mounted in said valve chamber, the valve stem projecting into the diaphragm chamber, a diaphragm against which the valve stem presses, a nut to close the diaphragm chamber and to bind the diaphragm periphery against the valve housing, said nut being formed with a projection, a plunger stem extending through the said nut and bearing against the diaphragm, a lever seated in said projection and adapted to bear against the said plunger stem to open the valve.